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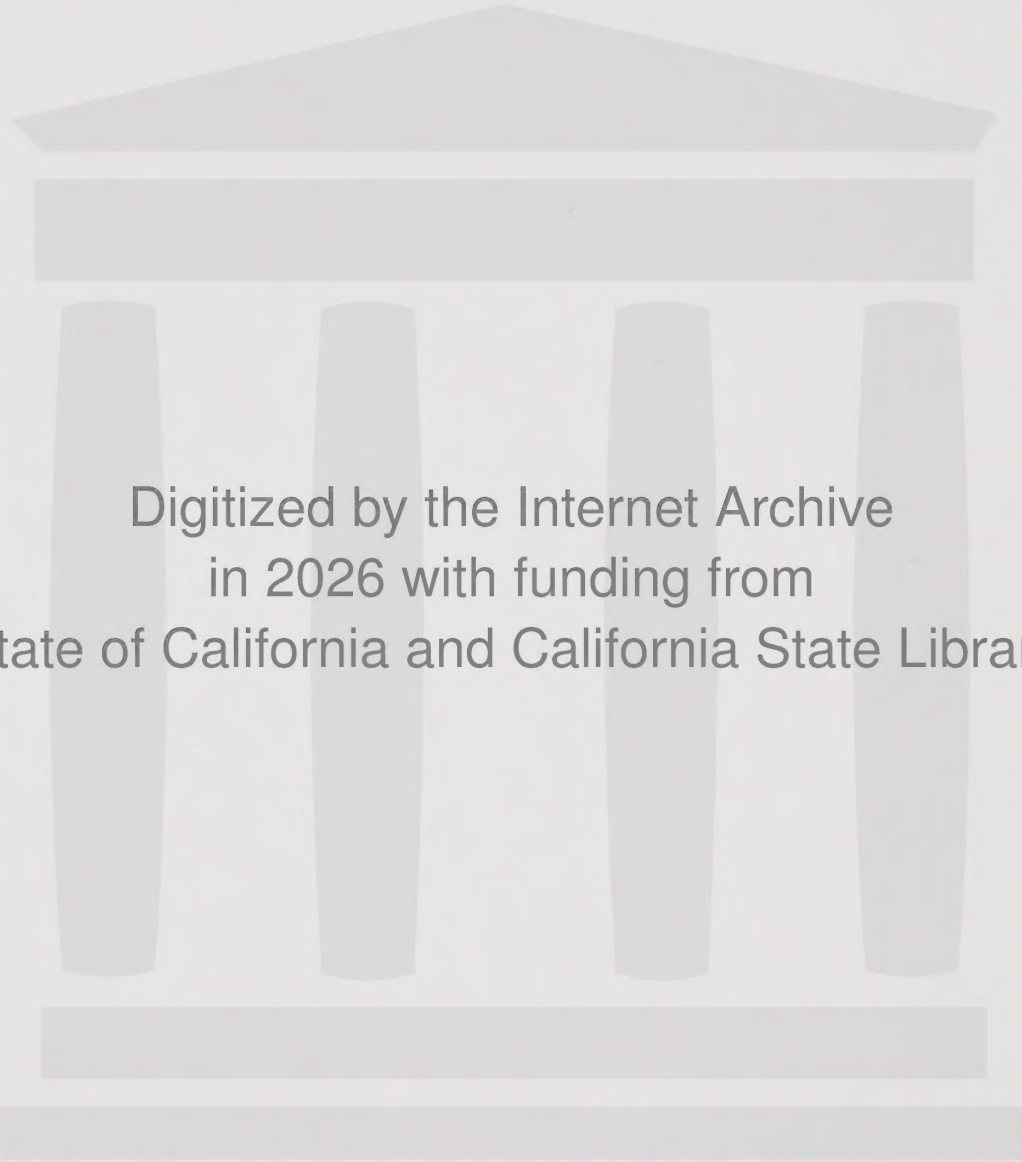


City of Orange Bikeways Master Plan Update

January 2001

2003 0481

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RESOLUTION NO. 9418

**A RESOLUTION OF THE CITY COUNCIL OF THE
CITY OF ORANGE UPHOLDING THE
RECOMMENDATION OF THE PLANNING
COMMISSION AND AMENDING THE
CIRCULATION ELEMENT OF THE GENERAL
PLAN BY UPDATING THE BIKEWAYS MASTER
PLAN.**

General Plan Amendment No. 5-00

Applicant: City of Orange

RECITALS:

WHEREAS, the Circulation Element of the City's General Plan includes a Bikeways Master Plan, which was last updated in 1995; and

WHEREAS, the California Department of Transportation Bicycle Transportation Account grant program provides state funding for the construction of bicycle lanes and routes for local agencies that meet specific eligibility requirements, including having a Bicycle Master Plan that has been approved or updated within the last two years; and

WHEREAS, the City retained Alta Consulting to prepare an update of the 1995 Bikeways Master Plan, and this update requires amending the Circulation Element of the General Plan; and

WHEREAS, a Negative Declaration was prepared, noticed, and posted for public review in accordance with Article 8, Section 15105 of the California Environmental Quality Act Guidelines; and

WHEREAS, the City Council held a duly advertised hearing on November 28, 2000, to consider the information contained in Negative Declaration 1654-00, including the initial study and comments received during the public review process, and General Plan Amendment No. 5-00, an amendment to the Circulation Element of the General Plan; and

WHEREAS, after finding and determining the hereinafter described facts, the City Council determined that the project could not have a significant effect on the environment, a Negative Declaration should be adopted, the Bikeways Master Plan for the Circulation Element should be adopted, and General Plan Amendment 5-00 should be approved, as recommended by the Planning Commission based on the facts more particularly set forth as follows:

1. The Bikeways Master Plan is necessary in order for the City to be eligible for state Bicycle Transportation Account grant funds.

2. The updated information included in the Bikeways Master Plan provides the City with the information it needs about the identified bikeway improvements and programs to prioritize projects and pursue appropriate amounts of funding to ensure their implementation and completion.
3. The grant funds that could be received by the City for implementation of the Bikeways Master Plan will enable the City to make physical improvements and develop community outreach programs that will encourage the use of bicycles as an alternative mode of transportation throughout the community, thereby reducing roadway congestion and motor vehicle pollution in the City.
4. The proposed General Plan Amendment could not have a significant effect on the environment and a Negative Declaration should be adopted.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Orange as follows:

1. The foregoing recitals are true and correct.
2. Negative Declaration 1654-00 is adopted.
3. The amendment to the Circulation Element of the General Plan is in the public interest.
4. The amendment is consistent with other elements of the City's General Plan.
5. The recommendation of the Planning Commission is upheld and the Circulation Element of the General Plan is amended to update the Bikeways Master Plan.
6. This General Plan Amendment No. 5-00 shall become effective thirty (30) days from and after the date of adoption of this Resolution.
7. The City Clerk is hereby authorized and directed to (a) make copies of this Resolution available to the general public within one (1) working day following the date of adoption, and (b) furnish to any person making a request for a copy of the adopted documents amending the General Plan within two (2) working days after receipt of a request therefor accompanied by payment for the reasonable cost of copying.

ADOPTED this 27th day of February, 2001.

ORIGINAL SIGNED BY
MARK MURPHY

Mark A. Murphy, Mayor of the City of Orange

ATTEST:

**ORIGINAL SIGNED BY
CASSANDRA J. CATHCART**

Cassandra J. Cathcart,, City Clerk of the City of Orange

I hereby certify that the foregoing Resolution was duly and regularly adopted by the City Council of the City of Orange at a regular meeting thereof held on the 27th day of February, 2001, by the following vote:

AYES:	COUNCIL MEMBERS:	SLATER, ALVAREZ, MAYOR MURPHY, COONTZ
NOES:	COUNCIL MEMBERS:	NONE
ABSENT:	COUNCIL MEMBERS:	NONE
ABSTAIN:	COUNCIL MEMBERS:	NONE

**ORIGINAL SIGNED BY
CASSANDRA J. CATHCART**

Cassandra J. Cathcart, City Clerk of the City of Orange

Executive Summary

Why Develop A Bicycle Master Plan?

The main purpose of this Bikeways Master Plan is to encourage the development of a unified bicycle system throughout the City of Orange with connections to other regional bike and pedestrians systems. Like many communities around the U.S., Orange is experiencing a resurgence in interest in bicycling as a means of transportation that is quiet, non-polluting, extremely energy-efficient, versatile, healthy, and fun. Bicycles also offer low-cost mobility to the non-driving public, especially the young. Bicycling is perhaps the most cost-effective and achievable means of reducing traffic congestion and improving air quality in the City of Orange. While bicyclists account for less than one percent of peak hour commuters now, a recent national survey found that over 30 percent of all workers would consider riding a bicycle to work if there were safe and convenient bikeways available. Add to this the figures that show over 50 percent of all employees live within five miles (an easy bike ride) of work, and the increasing amount of state and federal money available for non-motorized transportation facilities together make a compelling account for developing a comprehensive Bikeways Master Plan and city-wide system.

Citizen and Community Participation

The planning process utilized for this Bikeways Master Plan Update was based on extensive public outreach performed for the 95' Bikeways Master Plan. Through that process a system was devised that reflects bicyclists' needs and physical, operational, and financial opportunities and constraints. This effort built upon the previous plan utilizing staff and consultant research to prepare the Update.

Key Findings

The City of Orange offers many ideal conditions for all types of bicyclists, from commuters to recreational riders to school children. With some exception, the City of Orange is generally flat, has a temperate climate, and has a wide range of parks, schools, employment centers, and other destinations within an easy bicycle ride of most citizens.

The recreation and commuter needs analysis showed existing deficiencies in system continuity, linkage to regional destinations, and concerns about safety. A demand analysis based on a survey of workshop participants in 95', found that most people own bicycles and the average bicycle-owner rides for casual recreation.

Comments and suggestions from those public workshops included requests that the highest priority segments be targeted for improvements, and many specific recommendations such as improving the safety of major arterials. Many of these suggestions were incorporated into the plan.

An opportunity and constraints analysis resulted in several key findings. *First*, the existing network of bike lanes are well used, but are frequently disconnected and require improved signage and markings. *Second*, several of the arterials do not have bike lanes, which force bicyclists to negotiate heavy traffic or ride on the sidewalks. Third, there is a need for directional signage at specific locations.

Consistency with Transportation, Air Quality, and Energy Plans

The Bikeways Master Plan is consistent with local and regional transportation, air quality, and energy plans. Brief summaries of plan consistencies are provided in the text of the Plan.

Land Use, Population Density, Air Quality Benefits, and Demographics

Table 2 - Demographics and Bicycle Transportation in the City of Orange	
Population (2000 Department of Finance estimate)	127,000
Land Area (estimated)	23.3 square miles
Population per Square Mile	5,450
Estimated Orange Residents who would like to Bicycle for Pleasure	58,420
1990 Census Bicycle Commute Mode Share	604 commuters (0.6%)
Future Bicycle Commute Mode Share	1208 commuters (1.2%)
School-related bicycle commuters	2,435 commuters
Total future bicycle commuters	3,643 commuters
Reduced Vehicle Trips/Year	970,121
Reduced Vehicle Miles/Year	1,934,544
Reduced PM10/lbs./Year	35,596
Reduced NoX/lbs./Year	96,495
Reduced ROG/lbs./Year	140,448

Existing Facilities

The city currently (2001) provides approximately 30 miles of bikeways, of which 21 miles are bike lanes, 7 miles are bike paths, and the remaining 2 miles are formal or informal bike routes.

Multi-modal connections are found at all park and ride facilities. Bicycle racks and lockers are available at various locations around town including multi-modal connections, community facilities, hospitals, and community parks. No new multi-modal connections are proposed as a part of this plan. A survey of bicycle parking found that bicycle racks and lockers are available at schools, and a few stores; however, there is a general lack of parking at key destinations including downtown, many of the employment centers, and commercial locations. Cyclists are generally left to their own devices to lock their bikes at these locations. Improved bicycle parking standards including location recommendations and types of facilities to be used are included in the text of this Plan. Currently, cyclists who wish to use facilities for changing and storing their clothes, and or showering, are largely left to their own devices. Facilities are generally available at the local YMCA. This plan makes no new recommendations for the location of these facilities.

Major Recommendations of the Plan

The Bicycle Plan Update recommends the development of a comprehensive bikeway system in Orange, comprised of Class I bike paths, Class II bike lanes, and Class III bike routes. The system effectively connects all residential neighborhoods with the major activity centers in the City. The major components of the plan are:

- An integrated and comprehensive network of bikeway facilities and programs totaling approximately \$5.8 million to be invested over 15 years. A portion of the investment may be expected to come from existing Federal, State, and Regional funding sources.
- Adoption of the goals, policies, design standards and guidelines, and recommendations in the Plan.

Short-term projects include:

- Enhanced bicycle education programs for students and adults.
- Improved bicycle parking standards.
- New marketing activities to promote bicycling as a viable commute option.

The overall concept for the bicycle system is a linkage between Orange neighborhoods and all destinations such as schools, parks, transit connections, and employment/shopping destinations.

The system will serve all neighborhoods in Orange, linking people with schools, parks, shopping areas, work centers, and other destinations. Bike paths will provide important linkages and allow bicyclists to travel without having to interface with automobile and truck traffic along busy streets. Bike lanes and routes will provide an extra level of comfort for bicyclists negotiating city streets and avenues. Crossing improvements will help minimize conflicts between motorists and bicyclists. New bicycle lockers and racks will encourage bicycle commuters.

The Bicycle Plan outlines the planning and design criteria used to select the high and low priority projects. Detailed descriptions of each proposed bikeway segment are provided, along with implementation issues. The Plan provides specific recommendations on safety improvements, design standards, implementation, operations and maintenance, educational programs, performance standards, and funding.

Specific recommendations include:

A. Design Standards

- Adhere to Caltrans Design Manual Chapter 1000
- Where bike lanes are not feasible on collectors and arterials the City should attempt to maximize the curb lane widths to accommodate cyclists
- Provide 12' (3.5m) on bike paths where feasible and needed

- Give final decision on bike lane feasibility to local public works department
- Meet ADA requirements
- Prefer Class I (Paths) and Class II (Lanes) over Class III (Routes) on primary system

B. Support Facility Standards

- Provide bike racks and lockers at City facilities and regional activity centers
- Apply performance standards to new development based on Gross Leasable Area (GLA) and/or employees for the provision of bicycle storage facilities

C. Programs and Operations

- Teach bicycle education to all third and fourth grade children
- Develop a log and response procedure for bikeway maintenance
- Establish a Bicycle Coordinator position

Much of the system should be implemented as feasible over the next 3-15 years through road improvements and new development. This ultimate system is designed to meet the needs of bicyclists over the long term and help establish bicycling as a viable travel mode in Orange.

The translation of a bikeway system map to actual improvements in the field is not an effortless task. Implementation is generally under the purview of the City's Public Works Department. Aside from meeting specific design standards for bicycle, pedestrian, and motor vehicle traffic, the Department of Public Works must consider on-street parking, drainage, pedestrian movement, signals, traffic volumes and speeds, roadway capacity and level of service, mixture of trucks, maintenance, among a variety of items. However, it is expected that through individual or combined efforts many of the proposed projects, or major portions of them, will eventually be implemented.

There are a variety of potential funding sources including local, state, regional, and federal funding programs that can be used to construct the proposed bicycle improvements. Many of the federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits (see appendix). Local funding for bicycle projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each community based on gasoline taxes. Funding for many of the programs recommended in this plan will need to be funded either with TDA,

general fund (staff time), or possibly private grants. Projects shown on the 15 Year Bikeway System map should be given priority for various state and federal funding sources prioritized through the Orange County Transportation Authority (OCTA).

The total cost of the Orange bikeway system over 15 years is estimated at approximately 5.8 million for just over 52 miles of bikeways, of which the City of Orange is expected to be responsible for approximately 20%. The costs do not include numerous bike lanes and shoulder improvements that will be constructed as part of new roadway projects. It is important to note that while many of the projects can be funded with federal, state, and regional transportation, safety, and/or air quality grants, others are recreational in nature and must be funded by local or private sources.

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Acknowledgements

The planning team for the Bikeways Master Plan update was comprised of the citizens advisory committee, City of Orange staff members from the Planning, Public Works, and Community Services Departments. The effort was lead by Alta Transportation Consulting and is built upon the previous Bikeways Master Plan.

The advisory committee was formed to aid the City in the formulation of the Bikeways Master Plan. The group represents City of Orange residents with both commuter and recreational interests. Throughout the preparation of previous plans, the advisory committee, staff and consultants met regularly to review goals and objectives, route layout and standards. The planning team was comprised of:

Orange City Council:

Joanne Coontz	Mayor
Dan Slater	Mayor Pro Tem
Mark Murphy	Council Member
Mike Alvarez	Council Member
Mike Spurgeon	Council Member

Orange Planning Commission:

Randy Bosch	Chair
Ben Pruett	Member
H. Kenneth Romero	Member
Teresa E. Smith	Member
Toni Carlton	Member

Orange Traffic Commission:

Dick Yarger	Chair
Joe Fortier	Member
Frank Sciarra	Member
Wes Poutsma	Member
Frank Petronella	Member

Advisory Committee Members (95'):

Steve Buchanan	Bicycle Commuter
Joe Fortier	Traffic Safety Commission, Elementary School Principal
Ron Gaut	Transportation / Planning Committee
Bill Holt	Parks, Recreation & Cultural Arts Advisory Commission
Peter Jacobsen	Bicycle Commuter, Orange County Bicycle Coalition Member
Phil Knoll	Bicycle Commuter

City of Orange Staff Members (95'-2000):

Jere Murphy	Manager of Advance Planning, Community Development
Mary Ann Chamberlain	Senior Planner, Community Development
Doug Keys	Transportation Engineer, Public Works
Howard Morris	Landscape Coordinator, Community Services
Bill Trapp	Bicycle Commuter, Public Works
Dennis Schmitz	Traffic Operations, Public Works

Consultant Team:

Michael Jones	Principal, Alta Transportation Consulting
Joshua S. Abrams	Transportation Planner, Alta Transportation Consulting

INTRODUCTION

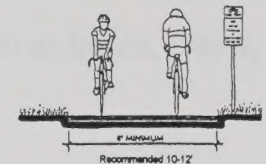
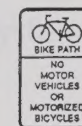
PURPOSE OF THIS DOCUMENT

The purpose of this Bikeways Master Plan Year 2001 Update is to build upon the City's existing Bicycle Planning efforts, obtain funding, and to establish a long range planning tool which will enable the City of Orange to develop a unified network of routes which will serve both recreational and commuter needs. This plan will serve as a guide over the next twenty years to allow the City to not only meet the needs of the residents of Orange as they travel within the city limits, but also to provide connectivity to adjacent city and county routes providing access to schools, parks and employment centers.

The Master Plan designates three types of bikeways:

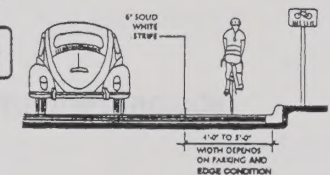
Class I Bike Path - Provides for bicycle travel on a right-of-way completely separated from the street.

Class I Bike Path



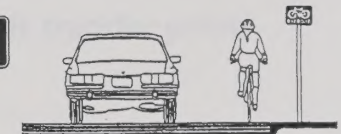
Class II Bike Lane - Provides a striped lane for one-way travel within the street.

Class II Bike Lane



Class III Bike Routes - Provides routes which are signed but not striped.

Class III Bike Route



GOALS & OBJECTIVES

Bikeways, like roads and sidewalks, are used by a wide variety of people, including children on their way to school, commuters riding to work, people exercising, racing, touring, running errands, and for recreation. Trip purpose is a useful tool in trying to find common needs between various user groups and translating that into actual physical improvements. On a general level, all bicycle trip generators can be broken down into (1) recreational riders and (2) commuters (whether it be to work or school). The biggest difference between these groups is that while recreational riders may be interested in routes leading to parks, through areas of interest, or tour/racing circuits, commuters are interested in the shortest, fastest, and safest route between two points, and generally bike during peak traffic periods.

In order to clearly define the needs and expectations of City of Orange residents as both commuters and recreational cyclists, the following Goals and Objectives were developed by the Bikeways Advisory Committee:

GOAL 1

To provide a safe citywide bikeway system which is integrated with other transportation systems such as buses, trains, park & ride facilities, in an effort to help reduce vehicle trips and vehicle emissions.

- Objectives
- 1.1 Develop a bikeway system that links all transportation systems together.
 - 1.2 Develop bikeway guidelines and standards that can help the City qualify for various federal, state, regional, and local funding programs.
 - 1.3 Plan the Capital Improvement Budget so that future roadway widening opportunities include bikeways that are called out in the Bikeways Master Plan.

GOAL 2

To link residential areas to major activity centers including areas of employment, transit stations & transfer points, schools & education centers, shopping, and recreation facilities.

- Objectives
- 1.1 Develop bikeway guidelines and a funding mechanism as part of a mitigation program for new growth and development.

- 1.2 Provide incentives for bicycle commuters, and include requirements for the provision of bicycle facilities by private development.
- 1.3 Formulate opportunities to accommodate bicyclists in future land use development.

GOAL 3

To connect the City of Orange bikeways to trails and paths in adjacent cities and provide linkages to the county-wide bicycle trails system including Santiago Creek, the Santa Ana River, and the Tustin Branch Trail.

- Objectives
- 1.1 Plan the trail system to connect to surrounding cities and unincorporated areas.
 - 1.2 Continue planning efforts with the County of Orange, City of Santa Ana and other interested parties, to link the Santiago Creek Trail System to the Santa Ana River Trail.
 - 1.3 Continue efforts to plan for the utilization of active and abandoned railroad rights of ways and waterways and utility corridors for future connecting bike trails.

GOAL 4

To provide and maintain a safe and convenient bikeways system that meets state standards, identifies transportation opportunities, and issues and describes support facilities needs.

- Objectives
- 1.1 Continue existing City efforts for bicycle education through schools, which is taught by the Police Department.
 - 1.2 Expand the bicycle education program by providing bike rodeos and other public safety awareness programs.
 - 1.3 Develop a Bicycle Awareness Program to encourage utilization of the bike system while promoting safety and health.
 - 1.4 Develop a marketing plan which would include the development of city bike map that displays existing bicycle facilities and offers commuter information and general bicycling safety tips.

Relationship between this Plan and other Planning Efforts in the City of Orange

The Bikeways Master Plan has the comprehensive scope and jurisdictional authority required to coordinate and guide the provision of all bicycle-related plans, programs, and projects in Orange. Many current planning efforts provide recommendations regarding one element or aspect of the bicycle network; the task of the Bikeways Master Plan is to ensure compatibility of all of these efforts, while attending to planning for areas of the City not already targeted by other studies. The studies or planning efforts listed below have been reviewed and consulted, studied for consistency, and where appropriate, folded into Orange's Bikeways Master Plan:

Circulation Element - City of Orange (1989)

The Circulation Element contains a number of policies that contain provisions for the development and refinement of the bikeways system in Orange. The most notable is the development of a City-wide system of bikeways corresponding with the trail system identified in the Open Space and Conservation Management Element. Others recognize the importance of providing safe bicycle parking and storage at transit hubs and key locations throughout the City.

Open Space and Conservation Element - City of Orange (1989)

The Open Space Element contains numerous relevant sections, including guidelines to promote the appropriate use of open space for recreation, such as the development of a trails system for use by hikers and bicyclists, and to promote responsible use of lands for public health and safety.

OCTA Commuter Bikeways Strategic Plan - (1995)

The Commuter Bikeways Strategic Plan, produced by the Orange County Transportation Authority, contains a detailed inventory of bikeways, needs analysis, and specific recommendations. A Primary Bikeway System is proposed that includes routes in the City of Orange area. The proposed primary system in the Plan and the final system developed in this plan are largely consistent, although there are some differences based on the more detailed evaluation performed as part of this study as well as planned recreational routes.

Relevant Legislation and Policies

There are several other state, regional, and federal requirements for master plans that are primarily related to funding that affect the development of bikeways plans.

The South Coast Air Quality Management District has various transportation demand management (TDM) policies and regulations related to bicycles. For example, specific reductions in vehicle trips and related ROG and Nox emissions from the construction of bike paths, lanes, and bike parking are provided.

Orange County (through the OCTA) has its own Regional Bicycle Master Plan which should be consistent with the City of Orange Bikeways Master Plan, especially since the OCTA is the main funding conduit for bikeway funds into the City of Orange.

Caltrans has played an oversight and review role for TEA-21 funding programs for bicycle projects. Each of the TEA-21 bicycle funding programs require approval of a Bicycle Master Plan with specified elements in order to qualify for the program.

On a state level, according to the California Bicycle Transportation Act (1994), all cities and counties should have an adopted bicycle master plan that contains:

- Estimated number of existing and future bicycle commuters
- Land use and population density
- Existing and proposed bikeways
- Existing and proposed bicycle parking facilities
- Existing and proposed multi-modal connections
- Existing and proposed facilities for changing and storing clothes and equipment
- Bicycle safety and education programs

- Citizen and community participation
- Consistency with transportation, air quality, and energy plans
- Project descriptions and priority listings
- Past expenditures and future financial needs

In addition to these required elements, the *Caltrans Highway Design Manual* contains specific design guidelines that must be adhered to in California. 'Chapter 1000: Bikeway Planning and Design' of the Manual sets the basic design parameters of on-street and off-street bicycle facilities, including mandatory design requirements.

Project ID	City of Orange Bike Way	1	2015	2015
Project Name	Orange City Light to Santa Ana City Light	1	2015	2015
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Project Name	Orange City Light to Santa Ana City Light	1	2015	2015
Project ID	Orange City Light to Santa Ana City Light	1	2015	2015
Project Name	Orange City Light to Santa Ana City Light	1	2015	2015

EXISTING CONDITIONS

The following chart lists existing routes and the location of these routes is depicted on the map on page 14. Please note, that in some areas, improvements are recommended to bring an existing route into conformance with Caltrans standards.

EXISTING CLASS I				
Street	Segment	Class	Miles	Comments
Rancho Santiago Boulevard	Hewes to Bond	I	3000' .57 mile	Located on the west side of the street.
Jamboree	Santiago Canyon Road to Canyon View	I	4500' .85 mile	Also has existing Class II.
Santa Ana River	Anaheim City Limits to Santa Ana City Limits	I	34000' 6.4 miles	
EXISTING CLASS II				
Batavia Street	Taft to Lincoln	II	7000' 1.32 miles	
Cambridge	Meats to 22 Freeway	II	17000' 3.22 miles	Timed parking (No parking: 7:30 - 9 and 2:30 - 4).
Cannon	Via Escola to Dump Hill Road	II	5000' .95 mile	
Canyon View	Outrider to Newport	II	2000' .38 mile	
Chapman	Cannon to Jamboree	II	12000' 2.27 miles	Add signage.*

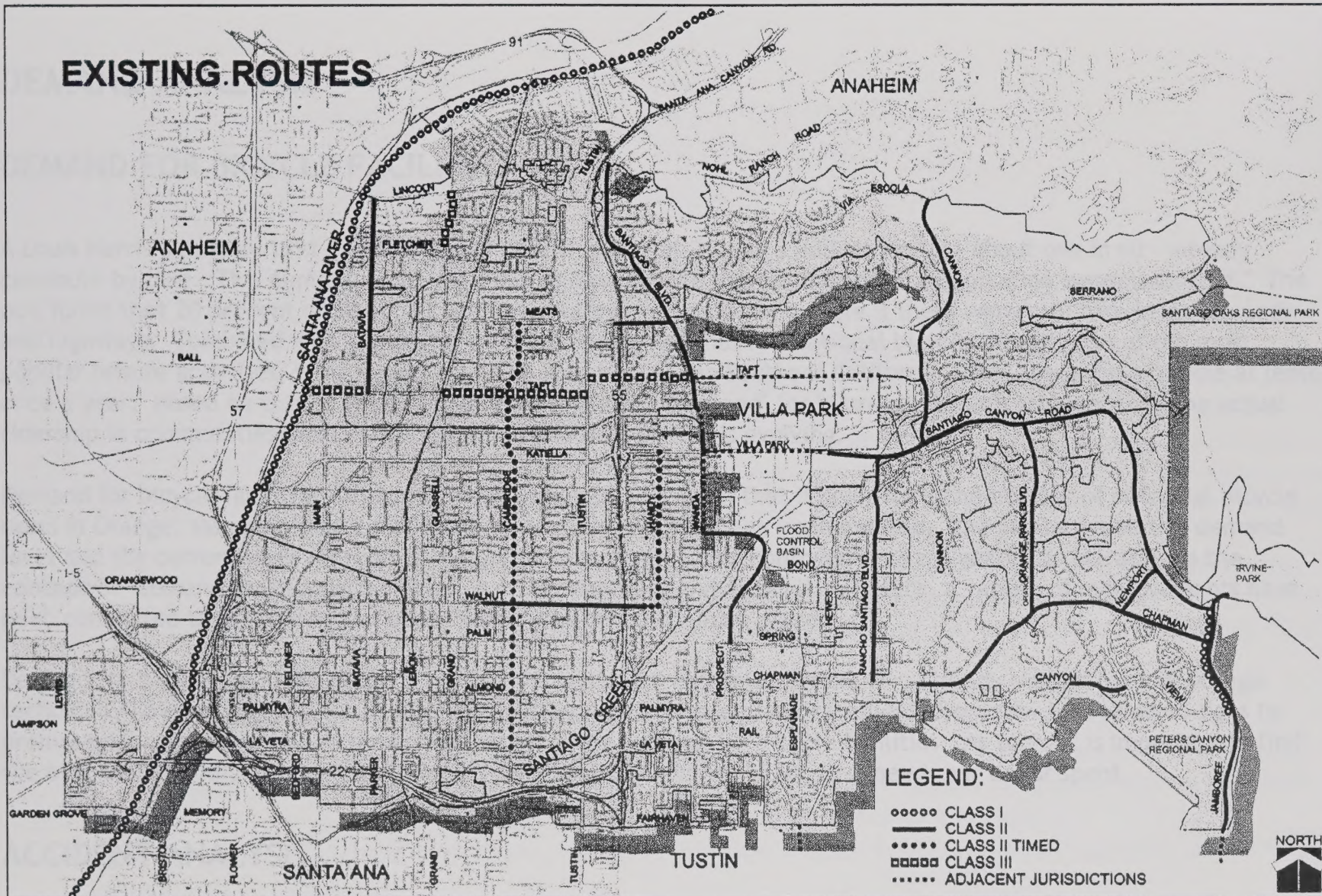
EXISTING CLASS II (Continued)				
Street	Segment	Class	Miles	Comments
Collins	Wanda to Curve	II	2750' .52 mile	Striping needs to be done on the north side between Roberts and Laurel.
Handy	Katella to Walnut	II	5500' 1.04 miles	Timed parking (No parking: 7:30 - 9 and 2:30 - 4).
Jamboree	Irvine Regional Park to Tustin City Limits	II	10000' 1.89 miles	Add signage.* Also has existing Class I between Chapman & Canyon View.
Meats	Park to SR 55 at Palmyra.	II	2500' .47 mile	
Newport	Santiago Canyon Road to Chapman	II	2000' .38 mile	Add signage.*
Orange Park Blvd.	Santiago Canyon to Chapman	II	7000' 1.33 miles	Add signage.* Resurface shoulder.
Prospect	Curve to Spring	II	3500' .66 mile	See Collins
Rancho Santiago	Bond to Chapman	II	4000' .76 mile	Parking Conflicts. Enforce timed parking.
Santiago Boulevard	Anaheim City Limits to Villa Park City Limits	II	9500' 1.80 miles	
Santiago Canyon Road	Creek to Jamboree	II	19750' 3.74 miles	Curve to Jamboree - Add signage*

EXISTING CLASS II (Continued)				
Street	Segment	Class	Miles	Comments
Walnut	Shaffer to 55 Freeway	II	5000' .95 mile	Parking Conflict. Enforce timed parking.
	Tustin Street to Handy	II	1000' .19 mile	Timed parking (No parking: 7:30 - 9 and 2:30 - 4).
EXISTING CLASS III				
Street	Segment	Class	Miles	Comments
Taft	Glassell to Santiago	III	8750' 1.66 miles	Add signage.*
	Santa Ana River to Batavia	III	2000' .37 mile	
Glassell	Lincoln to Fletcher	III	2500' .47 mile	Add signage.*
TOTAL Class I Class II Class III			7.82 miles 21.87 miles 2.50 miles 32.19 MILES	

*Per Caltrans standards (Chapter 1000), signs should be posted at:

- 1.) the beginning of the bike lane,
- 2.) arterial intersections,
- 3.) all major change in direction, and
- 4.) half-mile intervals (minimum).

EXISTING ROUTES

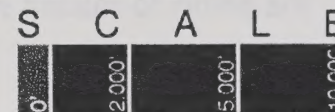


CITY OF ORANGE BIKEWAYS MASTER PLAN

JANUARY

UPDATE

2001



THIS MAP IS PROVIDED AS A GUIDE. THE CITY OF ORANGE IS NOT RESPONSIBLE FOR BICYCLISTS' SAFETY AND INTENDS NO REPRESENTATION AS TO THE SAFETY OR FITNESS OF THE SUGGESTED ROUTES FOR BICYCLE TRAVEL. BICYCLISTS ARE URGED TO OBSERVE ALL BICYCLE LAWS IN THE STATE VEHICLE CODE AND TO EXERCISE CAUTION AT ALL TIMES.

DEMAND ANALYSIS

DEMAND FOR BICYCLE FACILITIES

A Louis Harris poll (May 1991 Pro Bike News) determined that "nearly 3 million adults - about one in 60 - already commute by bike. This number could rise to 35 million if more bicycle-friendly transportation systems existed." The poll found that 20 percent of all adults would sometimes commute by bicycle if there were safe bike lanes on roads and highways. Combined with commuter ridership is the fact that recreational bicycle riding is one of the most popular leisure activities, with 38 percent of all members of the Southern California Auto Club using a bicycle at least once a year. Based on this, it is safe to say that the latent "demand" for bikeways is much stronger than the actual ridership in communities like Orange where the bikeway system is evolving.

Demand for bicycle facilities differs from current bicycle usage in that it represents the number of potential bicycle users in Orange; assuming that a successful bikeway system has been implemented. The gap between this demand level and the current level represents the population group future improvements are geared to attract. As the concept of "demand for bicycle facilities" is rather nebulous and difficult to isolate, a variety of measurements have been conducted through which an understanding of demand can be made.

Demand for bicycle facilities is also a flexible concept. For example, people who already ride bicycles in Orange technically have no demand for additional facilities. Each proposed improvement, from new bike lanes to signs to promotional campaigns will incrementally increase the demand for bicycle facilities. As such, it is important to find the best blend of improvements that meets the maximum number of people's needs per dollar spent.

ACCIDENT ANALYSIS

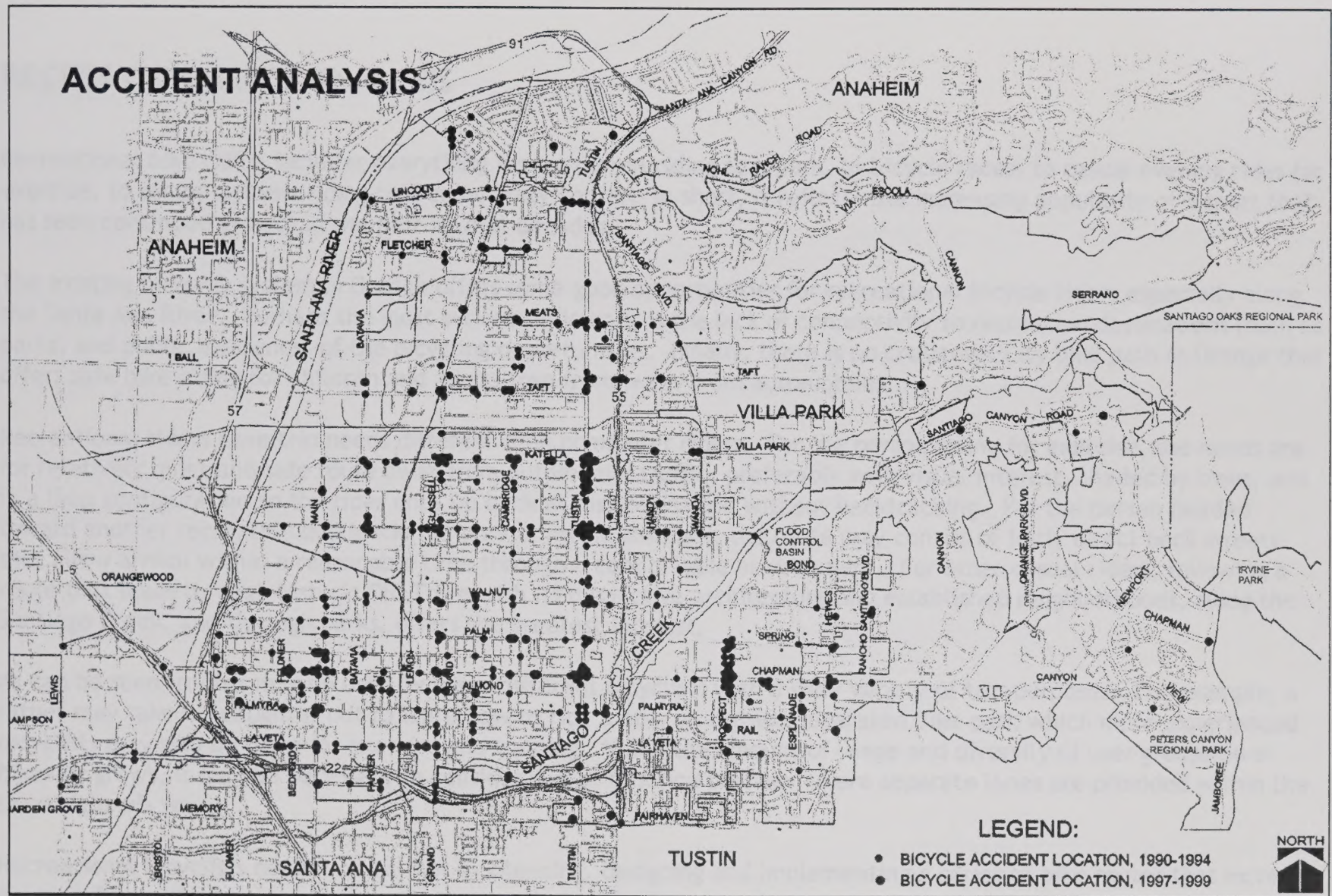
Safety is a major concern of both existing and potential bicyclists. For those who ride, the selection of the route, the shortest travel distance and ease of utilization is on-going reality. For those who don't ride, the hassles of riding are one of the most compelling reasons not to ride.

In discussing bicycle safety, it is important to separate out perceived dangers versus actual safety hazards. Bicycle riding in cities is commonly perceived as at least semi-dangerous because of the exposure of a lightweight, two-wheeled vehicle trying to negotiate in the no-man's land between automobiles, trucks, buses, and pedestrians. This is a perceived reality.

In fact, bicyclists face only a marginally higher chance of sustaining an injury than a motorist, based on numbers of users and miles traveled. Death rates are essentially the same with bicyclists as with motorists. Much of the perception of danger comes from motorists who have had to swing into an opposing lane to pass a bicyclist, or who must slow down in order to accommodate a bicyclist in the lane of traffic. With the implementation of the master plan, safety will be significantly improved, by providing bicyclists with an environment where they are more both physically and psychologically more secure.

The Accident Analysis Map on page 17 identifies the locations of all bicycle accidents in the City of Orange during the past three years and is provided as general background information, recognizing that there are no specific conclusions that can be drawn from it. The map displays graphically a picture of accident distribution from 1997 through 1999.

It is evident, from a cursory review of the accident locations, that they are not concentrated in any one portion of the city or on just a few streets. Accident distribution is across the City in a fairly uniform manner, with a few exceptions. The busier streets with higher traffic counts (i.e. Tustin and south Main Street), have a greater number of accidents than lower volume streets with existing bike lanes (i.e. Cambridge Street). One of the exceptions to this general observation, located in the eastern portion of the City, is on Prospect Street north of Chapman Avenue, where a large number of pedestrians have historically crossed in a mid-block crosswalk without traffic controls. Bicycle riders were probable users of the general area of this unsignalized crosswalk, which in the past connected a high-density residential area to shopping facilities. There are an unusually high number of bicycle accidents recorded at this location.



CITY OF ORANGE BIKEWAYS MASTER PLAN

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UPDATE

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alta

SCALE

0 2,000' 5,000' 10,000'

RECREATION NEEDS ANALYSIS

Recreational bike riding includes everything from children riding to a park, to bicycle races, to casual evening rides for exercise, to senior citizens riding to a community center. In short, it reflects the increasing popularity of a sport that has seen continued growth in the past several decades.

The existing bikeway system in Orange offers some good opportunities for recreational bicycle riders especially along the Santa Ana River. Perhaps the most serious deficiency is the lack of connectivity to recreation destinations (such as parks) and public awareness of the bicycling opportunities. Finally, there is no crosstown City bike path in Orange that offers safe bike riding for children and adults free from worry from automobiles.

Recreational riders have trip needs different than commuter riders. For the person riding for exercise, the needs are for relatively quiet and safe route away from automobile traffic, preferably with visual interest, shaded by trees, and in a loop configuration so the rider ends up back at his destination without backtracking. For the person headed toward another recreation destination (a park or movie theater), the route may consist of fairly direct back streets that allow arrival within a reasonable time through a comfortable environment. For other casual riders, following a route that leads through historic Old Town with its distinctive architecture and established neighborhoods, along the Santiago Creek, and through parks, offers the greatest interest.

As can be seen, routes may be used by many different bicyclists with a wide variety of trip purposes. For example, a father may take his daughter out to learn how to ride a bike on a grade separated bike path which more experienced bicyclists may also be using for exercise and training. When the amount of usage and diversity of user groups on a bikeway grows, it may be necessary to consider a dual-function bikeway where separate lanes are provided within the same right-of-way.

Recreational bicyclists needs will be met by planning, designing and implementing a series of bike routes that increase accessibility to Orange's internal recreation assets (parks, libraries, shopping areas), as well as bike paths that provide connections to perimeter regional parks (Irvine Regional Park, Santiago Oaks Regional Park, Peters Canyon Park and the Santa Ana River).

COMMUTER AND STUDENT NEEDS ANALYSIS

The need for commuter bikeways in Orange is evidenced by the number of people nationwide (20 percent) who have indicated that they would use a bicycle to get to work if there was a properly designed bikeway system. The following section on activity centers defines the destinations where recreational and commuting cyclists need to access.

Commuters and students follow similar paths, which is typically the most direct possible from origin to destination. For elementary school students, this may consist of residential and collector streets, with no crossings of major arterials. For junior high and high school students, riders may have to cross up to five or six major arterials and ride on major arterials to reach school. The same is true for commuters, who may ride up to ten miles to work.

Unfortunately, commuters and students need to travel during periods of peak traffic activity, and to destinations that typically have high levels of vehicle congestion and traffic speeds/volumes. Perhaps the worst-case scenario occurs when commuters/students ride along Chapman and Tustin, where high traffic volumes, multiple driveways, poor visibility, and distracted drivers combine to make matters extremely dangerous.

Another dangerous condition for all bicycle riders are high-volume, narrow streets with on-street parking. Parked cars trying to enter traffic and doors being opened into the bike lane represent significant hazards.

One of the most obvious problems for bikeways in the older parts of Orange is the narrow street widths which, when combined with demand for on-street parking and roadway capacity, virtually eliminate space for bike lanes. The key in these situations will be to identify streets with less traffic to encourage bike riders to use those streets that may not have bike lanes, but represent a lower safety concern.

Commuter bicyclists needs will be met by designing a system of bikeways leading to schools and employment and retail areas in as direct a method as possible on quieter side streets. In addition, bike storage and other facilities should be located, wherever possible, to make it easier and more practical for commuters to use bicycles.

Traffic and Air Quality Benefits

A key goal of the Bikeways Master Plan is to maximize the number of bicycle commuters in order to help achieve large transportation goals such as minimizing traffic congestion and air pollution. In order to set the framework for these benefits, national statistics and policies are used as a basis for determining the benefits to City of Orange.

- Currently, nearly 3 million adults (about 1 in 60) commute by bicycle. This number could rise to 35 million if adequate facilities were provided (according to a 1991 Lou Harris Poll).
- The latent 'need' for bicycle facilities in the City of Orange--versus actual bicyclists--is difficult to quantify; we must rely on evaluation of comparable communities to determine potential usage.
- Mode split refers to the choice of transportation people make whether for work or non-work trips. Currently, the average household in the U.S. generates about 10 vehicle trips per day. Work trips account for less than 30% of these trips on average.
- According to the 1990 U.S. census, less than 1% of all employed Orange residents commute primarily by bicycle. This does not include those who ride less than 50% of the time. The bicycle commute rate in Orange is roughly the same as the rate of California and the United States as a whole.
- The U.S. Department of Transportation, in their publication entitled "National Walking and Bicycling Study" (1995), sets as a national goal the doubling of the current bicycling mode shares by the year 2010, assuming that a comprehensive bicycle system is in place. Using future population estimates for Orange, this will translate into a bicycle commute mode share of about 1.2% or 1,208 commuters for the City of Orange. Add to this number commuters who bicycle occasionally and students at local schools, and the average number of daily bicyclists in Orange increases to an estimated 3,643 bicycle commuters by 2010. These bicyclists will be saving an estimated 2,657 vehicle trips per day, 970,121 trips per year, and 1,934,544 vehicle miles per year¹.
- The combined benefit of these future bicycle commuters over the next 20 years is a reduction of about 35,596 lbs. of PM10, 96,495 lbs. of Nox, and 140,448 lbs. of ROG.

- Walking and bicycling are two of the most popular forms of recreational activity in the United States, with 84% of Americans walking for pleasure and 46% bicycling for pleasure. These figures indicate that about 106,680 residents in the City of Orange would like to walk for pleasure and 58,420 would like to bicycle for pleasure. If nothing else, this indicates a latent demand for facilities and a potent constituency to push for better facilities (see Table 2).

Table 2 - Demographics and Bicycle Transportation in the City of Orange	
Population (2000 Department of Finance estimate)	127,000
Land Area (estimated)	23.3 square miles
Population per Square Mile	5,450
Estimated City of Orange Residents who would like to Bicycle for Pleasure	58,420
1990 Census Bicycle Commute Mode Share	604 commuters (0.6%)
Future Bicycle Commute Mode Share	1208 commuters (1.2%)
School-related bicycle commuters	2,435 commuters
Total future bicycle commuters	3,643 commuters
Reduced Vehicle Trips/Year	970,121
Reduced Vehicle Miles/Year	1,934,544
Reduced PM10/lbs./Year	35,596
Reduced NoX/lbs./Year	96,495
Reduced ROG/lbs./Year	140,448

ACTIVITY CENTERS

Before a bikeway system can be devised, an understanding of activity centers in Orange is important. Activity centers, including downtown, elementary schools, shopping centers, parks, and other facilities serve as the "attractions" for bicycle riders coming from residential areas. Thus, by understanding the hierarchy of activity centers, the framework for a bikeway system becomes apparent.

Activity centers can be broken down into two basic groups: Recreation centers and commuting centers. In some cases, these centers will be the same. A ranking of activity centers by type is provided below with locations shown on the map on page 24.

Schools

Chapman University
Rancho Santiago - Orange Canyon Campus
High Schools - Orange, El Modena, Villa Park, Canyon, Foothill
Middle Schools - Portola, Yorba, Rancho Santiago, Cerro Villa
Elementary Schools - 20+/-

Employment Centers

Main Place/Town & Country/St. Joseph Hospital
The City/County Complex/UCI Medical Center
Orange Northwest Industrial Area / Anaheim Stadium Industrial Area
Santa Ana Civic Center Complex
The Block

Hospitals

UCI Hospital
St. Joseph's Hospital
Chapman General Hospital
Children's Hospital

Transportation Centers

Orange Metrolink Station
Anaheim Amtrak Station

Parks

El Modina Park
Handy Park
La Veta Park
Olive Park
Pitcher Park
Santa Fe Depot Park
Santiago Hills Park
Shaffer Park
Yorba Park

Special Use Recreation Facilities

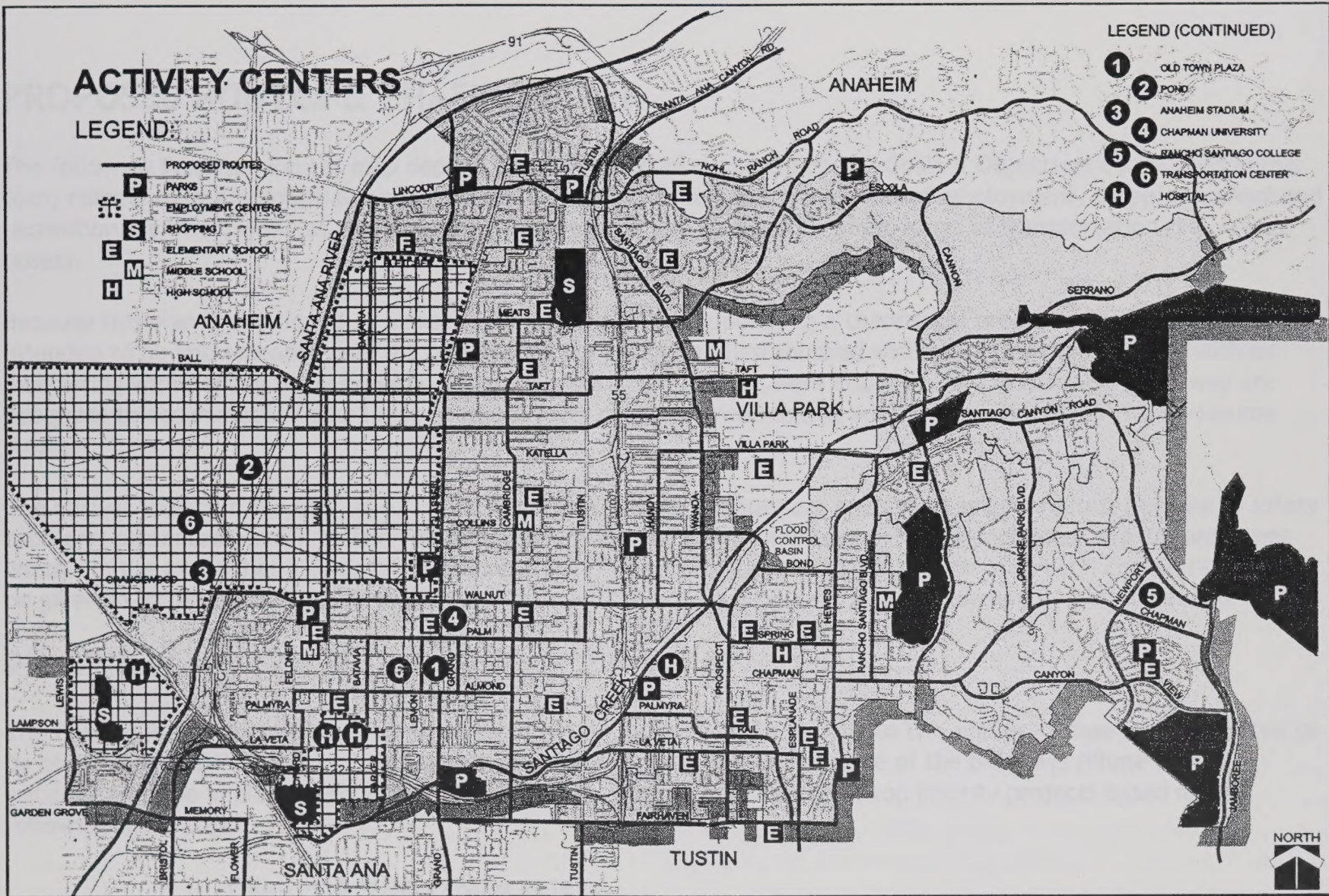
Senior Citizens Center
Community Gardens
Sycamore School Commission Picnic Shelter

Joint-Use Recreation Facilities

Killefer Park
McPherson Athletic Facility

Undeveloped City-Owned Parkland

Cerro Villa
Hart Park Extension
Serrano Heights Park (currently under development)



PROPOSED ROUTES & PHASING PLAN

The following Proposed Routes map depicts a system of bikeways based on the Goals & Objectives established in this plan, namely to link residential areas with major activity centers including areas of employment, shopping, school and recreation facilities, while at the same time integrating these routes with other forms of transportation (i.e. trains, buses).

Because this plan is envisioned as a practical, doable plan, as opposed to a theoretical proposal, the bike routes are intended to be implemented over a 3 to 15 year time period, and established within existing rights-of-way without interfering with parking for residential or business purposes. Routes were chosen where existing rights-of-way are adequate to accommodate bike lanes or where bikes can be allowed to mix with vehicles on slower, lower-volume streets.

The busiest streets in the City, (i.e. Tustin Street and Katella Avenue) are not shown as bike routes, because of safety problems presented by high traffic volumes, numerous turning movements at driveway locations, and limited street width. In the event that a comprehensive widening program is proposed for these type of streets, consideration will be given to include bike lanes at that time. However, there is no program for such widening in the foreseeable future.

PHASING PLAN

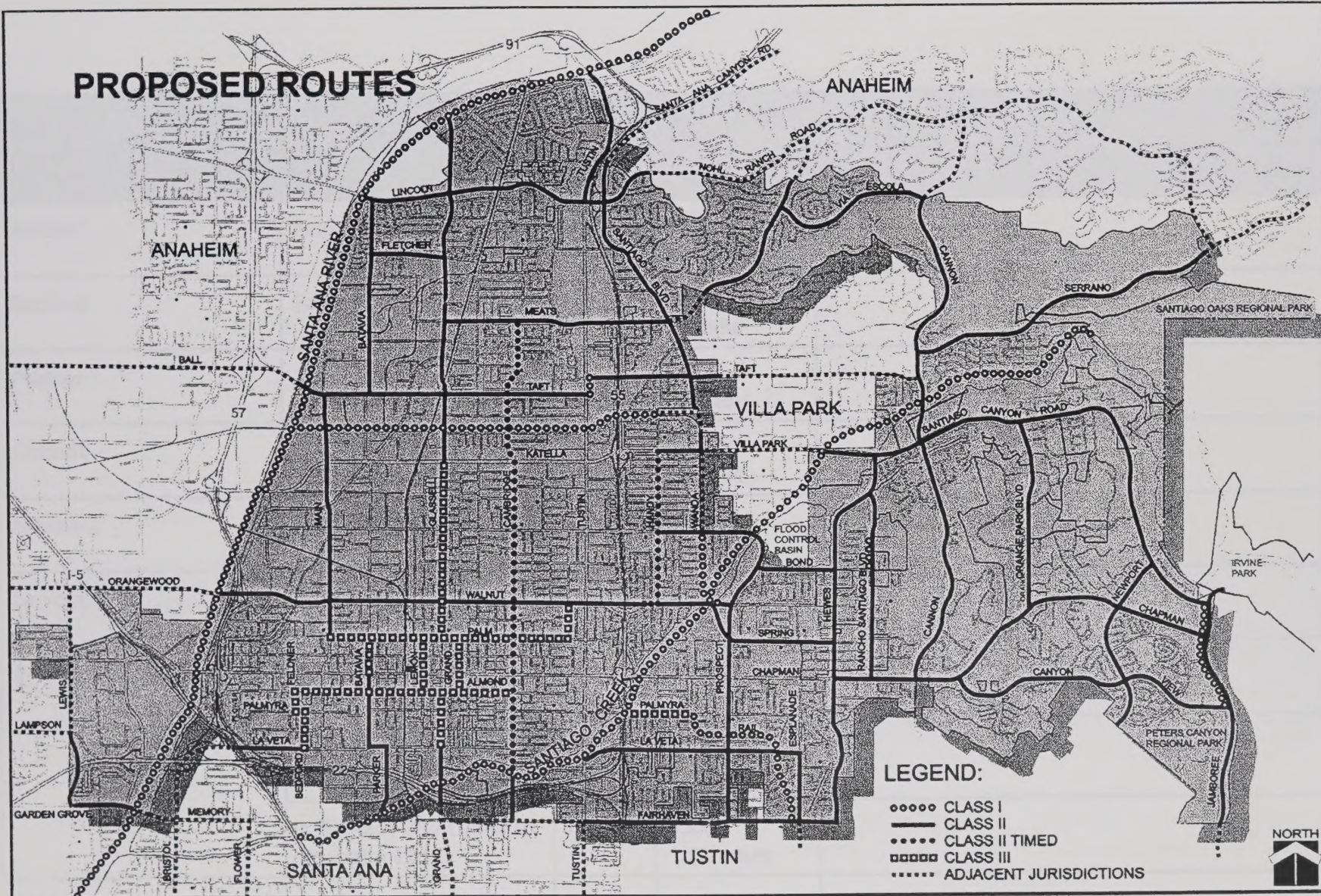
The Phasing Plan map on page 27, and on the chart on pages 28 to 33, delineate two phases. Phase I is anticipated to be completed within the short-term, approximately 3-15 years and the balance of the bikeways (Phase II) is anticipated to be implemented within 10 to 15 years. Phase I is composed of top priority projects based on the following three criteria:

1. Fills a void in the existing system.
2. Reflects current public and private trail development efforts.
3. Implements less expensive bikeways (i.e. Class III trails requiring only signing, no striping).

In the future, as development occurs in the eastern foothills of the City of Orange, all arterials that are classified as Secondary or larger will be constructed with Class II Bike lanes (see Exhibit 21 of East Orange General Plan GPA 2-88-A). Local and Commuter roadways will be reviewed for potential bike lanes when Tract maps are submitted to the City.

Short-term improvements are recommended to be implemented over the next five years, or as funding is available. It also presents a 'best case' scenario for Orange, providing a network of bicycle facilities and programs within the short term. Some of the more expensive projects may take longer to implement. It is important to note that many of the funding sources are highly competitive, and therefore impossible to determine exactly which projects will be funded by which funding sources. Timing of projects is also difficult to pinpoint exactly, due to dependence on competitive funding sources, timing of roadway and development projects, and the overall economy. Further refinement of a second phase of bikeway projects will occur toward the end of the Phase I time period, and will be based on circumstances and information available at that time.

PROPOSED ROUTES

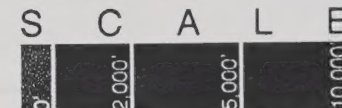


CITY OF ORANGE BIKEWAYS MASTER PLAN

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PHASE I				
Street	Segment	Class	Length	Comments
Almond	Feldner to Cambridge	III	8000' 1.52 miles	
Bedford	Palmyra to La Veta	III	1250' .24 mile	
Feldner	Almond to Palmyra	III	500' .1 mile	
Glassell	Fletcher to Meats	II	2000' .38 mile	
Katella	Handy to Wanda	II	2000' .38 mile	
La Veta	Bristol Overpass to Bedford	II	2250' .47 mile	
Meats	Glassell to Cambridge	II	2750' .52 mile	
	Cambridge to Santiago Boulevard	II	5280' 1 mile	
	Villa Park City Limits to Anaheim City	II	5500' 1.04 miles	
Palmyra	Feldner to Bedford	III	250' .05 mile	
Santiago Creek	Santa Ana City Limits to Cambridge	I	5000' .96 mile	

	Cambridge to SR 55 (at Palmyra)	I	5170' .99 mile	
Taft	Batavia to Glassell	II	2100' .39 miles	
Tustin	Taft to Taft	I & II	750' .14 mile	East side - Class I path to be located on Edison Substation property (North bound traffic) West side - Class II (South bound traffic)
TOTAL PHASE I			8.18 miles	
PHASE II				
Street	Segment	Class	Length	Comments
Batavia	Palm to La Veta	II	3750' .71 mile	Class II and Class III
Bond	Prospect to Hewes	II	3000' .57 mile	
Cambridge	La Veta to Creek	II Timed	750' .14 mile	
	Creek to Fairhaven	II	1750' .33 mile	
Cannon	Santiago Canyon Road to Chapman	II	9500' 1.80 miles	

PHASE II (continued)				
Street	Segment	Class	Length	Comments
Canyon View	Newport to Jamboree	II	4000' .76 mile	
	Chapman to Outrider	II	4500' .85 mile	
Chapman	Hewes to Cannon Street	II	3000' .57 mile	
Collins	Handy to Wanda	II	1250' .24 mile	
Esplanade	La Veta to Fairhaven	II	3000' .57 mile	
Fairhaven	Santa Ana City Limits to Hewes	II	10500' 1.99 miles	
Fletcher	Batavia to Glassell	II	2500' .47 mile	Timed
Garden Grove Blvd.	Lewis to Santa Ana River	II	2500' .47 mile	
Glassell (North)	River to Lincoln	II	2500' .47 mile	
Glassell (North)	Meats to Katella	II	4950' .94 mile	

PHASE II (continued)				
Street	Segment	Class	Length	Comments
Glassell (North)	Katella to Palm	III	6500' 1.24 miles	
Glassell (South)	Almond to La Veta	III	2000' .38 mile	
	La Veta to Santa Ana City Limits	II	2000' .38 mile	
Grand	Palm to Almond	III	2000' .38 mile	
Hewes	Rancho Santiago to Fairhaven	II	14000' 2.65 miles	
La Veta (West)	Batavia to Parker	II	750' .14 mile	
La Veta (East)	Santiago Creek to Esplanade	II	8000' 1.52 miles	
Lemon	Palm to Almond	III	2000' .38 mile	
Lewis	Lampson to Garden Grove Blvd.	II	3000' .57 mile	
Lincoln Avenue	Batavia to 55 Freeway	II	8250' 1.56 mile	

PHASE II (continued)				
Street	Segment	Class	Length	Comments
Lincoln Street	Walnut to Palm	III	1500' .28 mile	
Main	Taft to Palm	II	9250' 1.76 mile	
Maple	Rail to Lemon	III	300' .06 mile	Design issues will be resolved with OCTA
Newport	Chapman to Tustin City Limits	II	5000' .95 mile	
Nohl Ranch	55 Freeway to Anaheim City Limits	II	2750' .52 mile	
Palm	Main to Lincoln	III	8750' 1.66 mile	
Palmyra	Creek to Rail	III	2500' .47 mile	
Parker	La Veta to Santiago Creek	II	2750' .52 mile	
Prospect	Spring to Fairhaven	II	6750' 1.28 miles	
Rail	Collins to Creek	I	3000' .57 mile	
	Creek to Fairhaven	I	9500' 1.80 miles	

Rancho Santiago Blvd.	Santiago Canyon Road to Hewes	II	1500' .28 mile	
Santiago Creek	SR 55 at Palmyra to Santiago Oaks Regional Park	I	22500' 4.26 miles	
Serrano	Cannon to Nohl Ranch Road	II	12000' 2.27 miles	
Spring	Prospect to Hewes	II	3750' .71 mile	
Tustin	Santa Ana River to Lincoln	II	5000' .95 mile	
Tustin Branch Trail	Santa Ana River to Santiago Blvd.	I	16000' 3.03 miles	A shot segment extends into the Villa Park City Limits to reach Santiago Blvd.
Via Escola	Meats to Cannon	II	5750' 1.09 miles	
Walnut	River to Shaffer	II	10000' 1.89 miles	
	Handy to Prospect	II	3500' .66 mile	
TOTAL PHASE II			44.62 miles	
TOTAL ALL PHASES			52.80 miles	

STANDARDS

The Caltrans Highway Design Manual, Chapter 1000: Bikeway Planning and Design, provides standards for bikeway implementation. Deviation from the standards is not recommended since adherence provides not only proven applications that have been in practice throughout the State but also legal protection to the City in the event that a cyclist is injured as long as the City has implemented the route in accordance with the accepted State standards. Chapter 1000 should be referred to prior to design and installation of segments. However, to facilitate understanding of the standards, the following summary is provided:

CLASS I BIKE PATHS

Width:

1 way travel	5' + 2' level shoulder minimum
2 way travel	8' + 2' level shoulder minimum
Heavy volume 2 way travel	12' + 2' level shoulder minimum

Vertical Clearance: 8' minimum

Grades: 5% maximum (steeper grades acceptable for segments less than 500')
2% ideal

Cross Slope: 2%

Surface: 2" minimum of asphalt concrete

RESTRICTIONS: Sidewalks are not considered Class I facilities because they are primarily intended to serve pedestrians and do not minimize cross flows. Conflicts between pedestrians and bicyclists on sidewalks make their shared use problematic. Motorized bicycles and vehicles should be prohibited on bike paths and signing should be implemented indicating this restriction.

STRIPING: A yellow centerline to separate opposing directions of travel, is desirable when there is heavy use, when sight distance is restricted due to curves, or when the path will be used at night time.

INTERSECTIONS WITH STREETS: Rider activated signal controls are recommended. Signs advising the cyclist of the approaching highway should be placed on the bike path advising cyclists to stop at the intersection. Bike crossing signs should also be placed in advance of the crossing to alert motorists of the bike path.

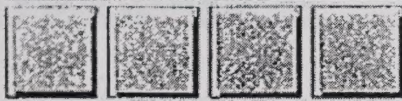
SEPARATION OF PATH: Bike paths closer than 5 feet from the edge of the shoulder shall include a barrier (steel rail, fence, dense shrubs, concrete barrier) to prevent bicyclists from encroaching onto the highway. Low barriers are not recommended because bicyclists could fall over them and into oncoming traffic.

BARRIER POSTS: Bollards or barrier posts are often installed to prevent motorized vehicles from using the bike path. When locating these barriers, it is critical that barriers are well marked and visible during the day and night to cyclists.

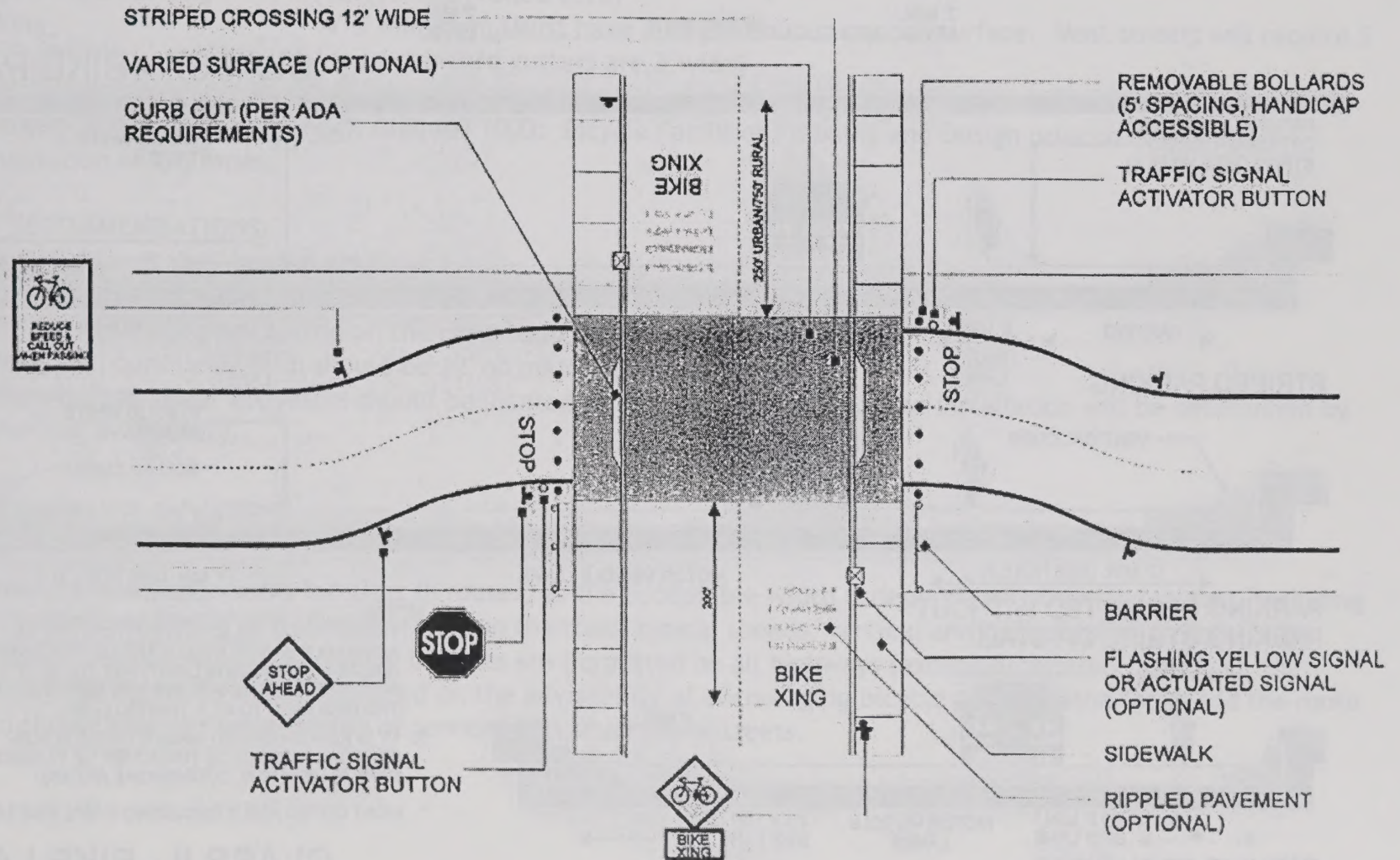
An "envelope" (see Caltrans Chapter 1000 for standards) should be striped around the barrier to increase its' visibility. If sight distance is limited, advance warning signs and/or painted pavement warnings should be provided. Posts should be located 5 feet apart to allow safe passage of bicyclists without dismounting and should be installed for easy removal to facilitate emergency and maintenance vehicles.

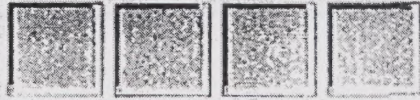
OTHER RECOMMENDATIONS:

- A. All curve radii, super elevations, stopping sight distances, and lateral clearances on horizontal curves should conform to Caltrans Chapter 1000 specifications.
- B. Signed maximum speed will be 15 mph unless otherwise posted.
- C. Barriers should provide for disabled access.
- D. Construct bike path to accommodate maintenance vehicles.
- E. Close bike path at dusk unless lighting will be provided. Lighting should be low wattage to minimize glare into adjacent properties and placed no higher than 12 feet.
- F. Direct pedestrians to unpaved path when opportunity exists.
- G. Provide adequate fencing (min. 54") to protect privacy of neighbors.
- H. All landscaping should be low maintenance/low water use.
- I. Push button signal activators should be located at street/bikeway intersections. The installation will be determined by funding availability.

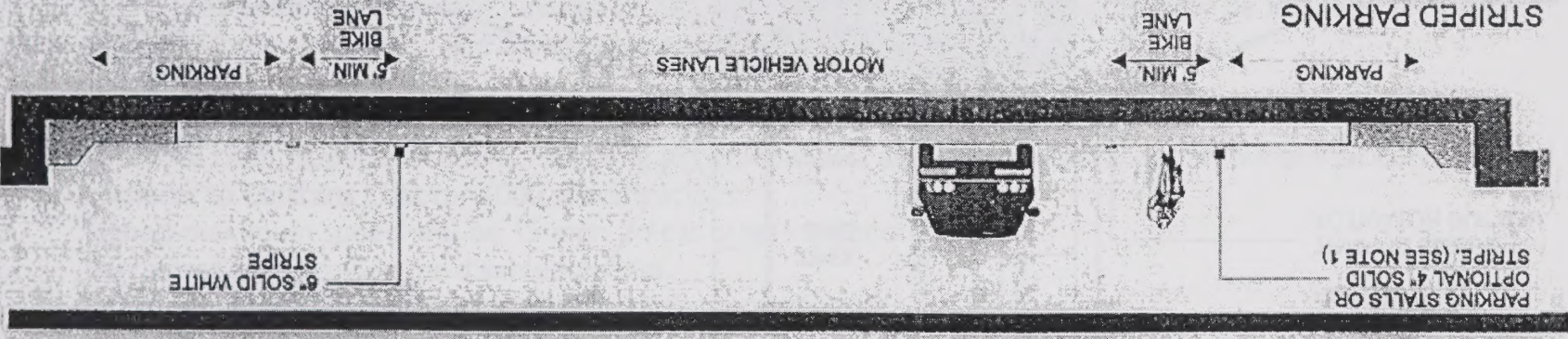
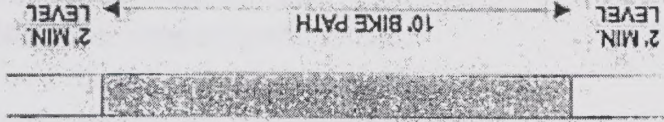


CLASS I BIKEWAY STREET CROSSING





CLASS I - BIKE PATH



STRIPED PARKING

PARKING STALLS OR
OPTIONAL 4' SOLID
STRIPES. (SEE NOTE 1)

PARKING 5' MIN

BIKE
LANE

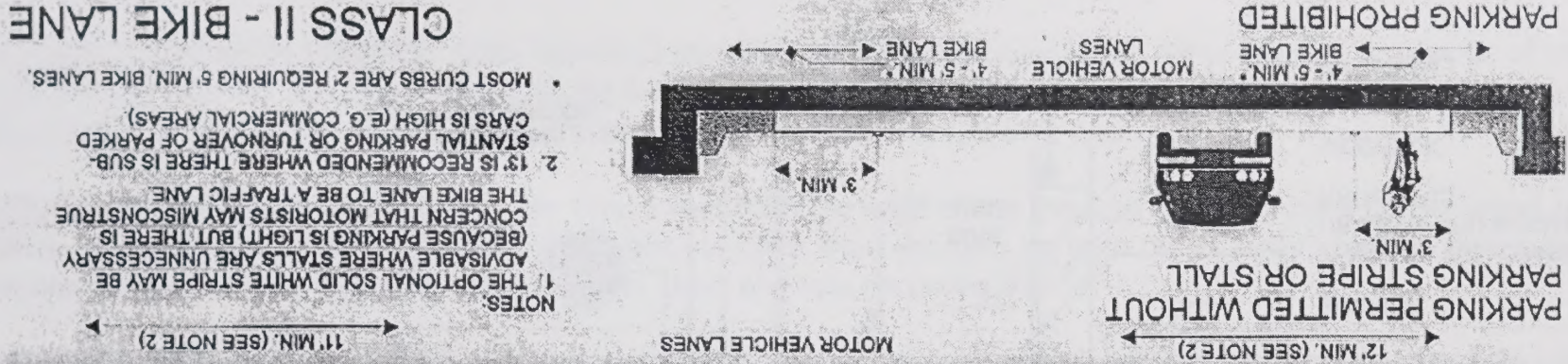
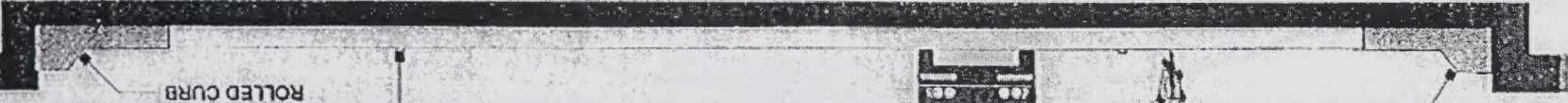
MOTOR VEHICLE LANES

5' MIN
BIKE
LANE

PARKING

6' SOLID WHITE
STRIPES

ROLLED CURB



PARKING PERMITTED WITHOUT
PARKING STRIPE OR STALL
12' MIN. (SEE NOTE 2)

MOTOR VEHICLE LANES

3' MIN

3' MIN

4' - 5' MIN.
BIKE LANE

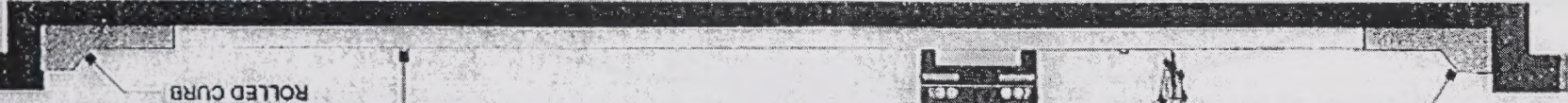
MOTOR VEHICLE
LANES

4' - 5' MIN.
BIKE LANE

CLASS II - BIKE LANE

- NOTES:
1. THE OPTIONAL SOLID WHITE STRIPE MAY BE ADVISABLE WHERE STALLS ARE UNNECESSARY (BECAUSE PARKING IS LIGHT) BUT THERE IS CONCERN THAT MOTORISTS MAY MISCONSTRUCTURE THE BIKE LANE TO BE A TRAFFIC LANE.
 2. 13' IS RECOMMENDED WHERE THERE IS SUBSTANTIAL PARKING OR TURNOVER OF PARKED CARS IS HIGH (E.G. COMMERCIAL AREAS).
- MOST CURBS ARE 2' REQUIRING 5' MIN. BIKE LANES.

11' MIN. (SEE NOTE 2)



CLASS II BIKE LANES

Width:

Striped Curb Parking	5' minimum
Un-Striped Curb Parking	12' (11' with rolled curb)
No Parking	4'-5' minimum (Must have 3' of continuous smooth surface. Most streets will require 5' since standard gutters are 2' wide)

Refer to the Caltrans Design Manual, Chapter 1000: Bicycle Facilities Planning and Design prior to design and implementation of any lanes.

OTHER RECOMMENDATIONS:

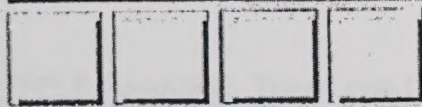
- A. All bike lanes shall be one way.
- B. Bike lanes shall not be placed between the parking area and the curb.
- C. Bike lanes should be located on the right hand side of one-way streets.
- D. Minimum curb lane width should be 12' on major arterials.
- E. Push button signal activators should be located at street intersections. The installation will be determined by funding availability.

CLASS III BIKE ROUTES

There are no prescribed widths for Class III routes, as the acceptable width is dependent upon many factors, including the volume and character of vehicular traffic on the road, typical speeds, vertical and horizontal alignment, sight distance, and parking conditions. Since bicycles are permitted on all highways (except prohibited freeways), the decision to sign the route should be based on the advisability of encouraging bicycle travel on the route and the route selected should offer a higher degree of service than alternative streets.

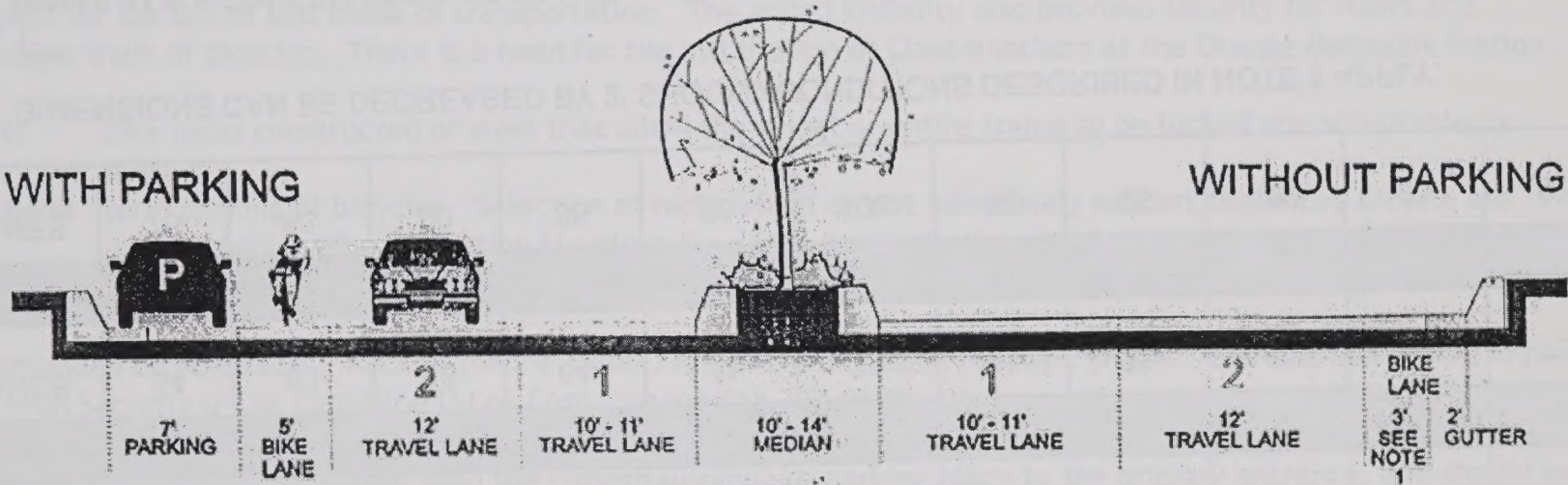
SUPPORT FACILITIES

The absence of support facilities is frequently mentioned by both bicyclists and would be bicyclists as one of the reasons they don't ride or ride less often. Therefore, in order to have an effective bicycle system that encourages its use as an alternate form of transportation, and provides linkages to public transportation, such as trains and buses, support facilities should be provided to increase usage of the system. Minimum requirements for bicycle parking are provided on page 42.

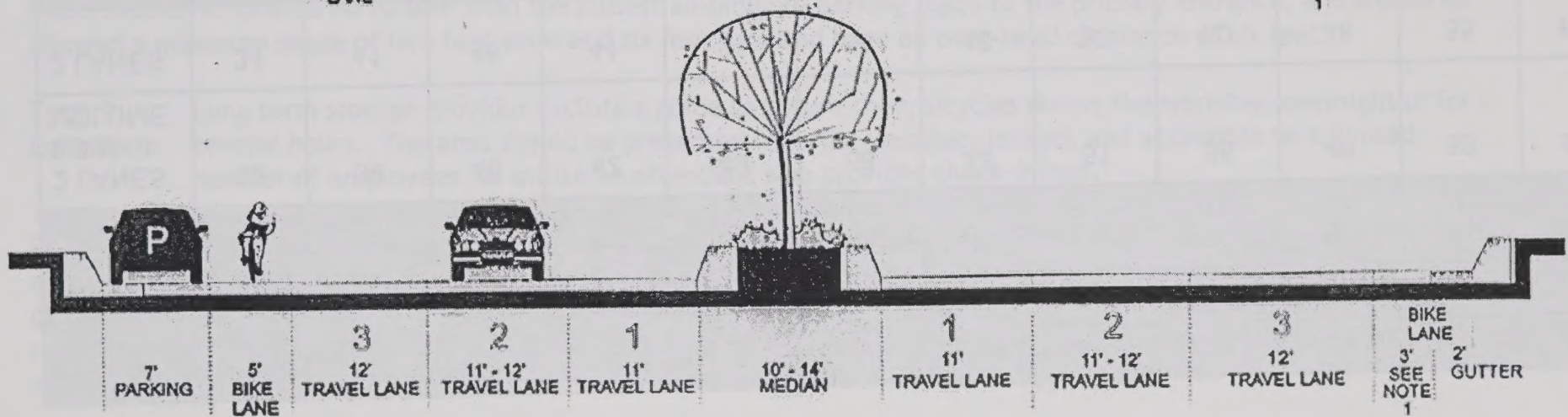


TYPICAL CLASS II BIKE LANE STREET CROSS SECTION

WITH PARKING



WITHOUT PARKING



NOT TO SCALE

MINIMUM STREET WIDTHS TO ACCOMMODATE BIKE LANES*

	NO MEDIAN/TURN LANE			10' MEDIAN/TURN LANE			12' MEDIAN/TURN LANE			14' MEDIAN/TURN LANE		
	PARKING			PARKING			PARKING			PARKING		
	NO	ONE SIDE	BOTH SIDES	NO	ONE SIDE	BOTH SIDES	NO	ONE SIDE	BOTH SIDES	NO	ONE SIDE	BOTH SIDES
2 LANES LOW VOLUME	32	39	46	42	49	56	44	51	58	46	53	60
2 LANES	34	41	48	44	51	58	46	53	60	48	55	62
4 LANES	54	61	68	64	71	78	66	73	80	68	75	82
6 LANES	76	83	90	86	93	100	88	95	102	90	97	104

* DIMENSIONS CAN BE DECREASED BY 2' SHOULD CONDITIONS DESCRIBED IN NOTE 1 APPLY.

NOTE 1:

MINIMUM 3' BETWEEN EDGE OF TRAVEL LANE AND CONCRETE GUTTER JOINT. BIKE LANE CAN BE REDUCED TO 4' WHERE AN UNINTERRUPTED SMOOTH SURFACE OF 4' IS AVAILABLE IN ADDITION TO GUTTER AREA.

BICYCLE PARKING There are two basic types of bicycle parking, short-term and long term. In both types, signage should be provided which clearly delineates the bicycle parking facilities. Bicycle parking should be given a location close to main entrances, in order to encourage its use by making it highly visible, and by giving cyclist preferential treatment for the use of this mode of transportation. The added visibility also provides security for riders and discourages theft of bicycles. There is a need for the installation of Class II lockers at the Orange Metrolink Station.

Type 1: Bike racks constructed of steel that allow the wheel or entire frame to be locked are acceptable for short-

Short-term term parking of bicycles. Selection of racks which do not adequately support the entire bicycle are unacceptable. When selecting bicycle racks which hold only the wheel, it is very important that the device should hold at least half of the wheel (180 degrees) firmly in place.

Recommended bicycle racks: Rack III (phone 1-800-733-1971), Bike-Bank (Graber, phone 1-800-542-6644), and Arch-Lok & High Security U-Lok (Sunshine U-Lok Corp., phone 818-707-0110).

Racks should be located no further than the closest automobile parking place to the primary entrance, and should be allowed a minimum space of two feet wide and six feet long and have an over-head clearance of six feet.

Type 2: Long term storage provides cyclists a place to secure their bicycles during the workday, overnight or for
Long term several hours. The area should be protected from the weather, locked, and accessible to a limited number of employees, or utilize an attendant who provides check-in/out.

Bike lockers also provide excellent long-term storage. They are enclosed box-type storage facilities generally constructed of fiberglass, reinforced plastic, or sheet metal that offer weather protection and maximum theft protection. Because lockers can quickly become storage units for everything but bicycles, locker procedures are recommended. To avoid misuse of lockers for other than their intended purpose, and to insure that lockers will be available to those who will most often use them, the following procedures are suggested:

Locker Procedures:

1. Lockers and locks will be issued on a first come basis to applicants.
2. Only master system locks will be utilized on lockers, which can be accessed by security personnel.
3. Applicants must appear in person for locker issuance.

4. Lockers can only be used to store bicycles and associated clothing and equipment necessary for commuting. No food storage is allowed. Storage of other items will result in revocation of locker privileges.
5. Lockers must be accessed at least once a month to retain locker privileges. Time clock punch in can be utilized to verify activity.

SHOWER FACILITIES Most bicycle commuters feel more comfortable if they can clean up prior to starting the work day. In order to encourage more people to commute by bicycle, showers and clothing lockers should be provided in workplaces where there are 200 or more employees.

Public showers are not recommended because of the high cost of maintaining a quality facility that will be acceptable to commuters. However, in order to provide wider access to showers and clothing lockers, the city should facilitate the use of showers at local health clubs and the YMCA/YWCA by providing incentives for these facilities to open them to commuting cyclists for a nominal charge to users. The city's incentive could take the form of subsidies or relief from business license taxes to participating facilities.

BICYCLE PARKING & SHOWER GUIDELINES

Land Use	Bike Racks	Long-Term Parking Lockers & Secured Covered Areas	Shower Facilities
Commercial includes offices, retail, churches, hospital, medical office, banks, restaurants, industrial.	<u>Less than 50 auto spaces:</u> 1 bike space / 20 required auto spaces <u>50 or more auto spaces:</u> 1 bike space / 33 required auto spaces	50% of required bicycle parking 50% of required bicycle parking	Offices with 200 or more employees: 1 shower for each gender per each 200 employees
Regional Shopping Center	5 spaces per mall entrance & 10 spaces at entrance to theater and food court	20% of required bicycle parking	None
Hotel/Motel	1 space per 10 employees 5 spaces minimum	50% of required bicycle parking	None
Education			
Elementary Schools	1 bike space per 10 students	None	None
Junior High Schools	1 bike space per 5 students	None	None
High Schools	1 bike space per 20 students	None	None
Colleges	1 bike space per 10 required auto spaces	50% of required bicycle parking	None
Transportation Center	1 bike space per 10 parking spaces	50% of required bicycle parking	None
Apartments	<u>Less than 10 units:</u> 1 bike space per unit 5 bike spaces minimum <u>10 or more units:</u> .5 bike space per unit	None None	None

BICYCLE SAFETY

With a few exceptions, bicycles are subject to the same rights and restrictions as automobiles under the California Vehicle Code. Bicycles moving with the flow of traffic may occupy the right hand portion of a travel lane, unless they are making a left turn, in which case they may merge into the left turn lane. Bicyclists may also use pedestrian crosswalks at intersections, but must walk their bicycles.

Two common issues in many cities are:

1. Can bicyclists legally use sidewalks and,
2. Must bicyclists always use bike lanes and paths when they are provided.

Caltrans advises in Chapter 1000 that children may use sidewalks to ride bicycles. While the California Vehicle Code (Section 21100 Subdivision H) permits bicycles on sidewalks, user conflict hazards may arise, as such local jurisdictions may pass ordinances to make it illegal.

Current law does require bicycles to use bike lanes unless there is debris or other obstacles or safety hazards in the lane. No state law currently requires bicyclists to use a bike path rather than a parallel roadway. In some locations, bicyclists are permitted to ride on a sidewalk to avoid a narrow, busy section of roadway.

CLASS I SAFETY:

Bike paths are problematic when they frequently interface with streets. For this reason it is recommended that these paths be simultaneously implemented with the designated landscape buffers/fences and intersection signals (with loop detectors or rider activated buttons). On existing paths where buffers and signals are currently not in place, the City should place a high priority on bringing these sections up to Caltrans standards. Where heavy right turn traffic conflicts with bicyclists, NO RIGHT ON RED signs should be provided. At locations where there are heavy student crossings, the City may elect to put in a flashing yellow light or full signal, which can be activated by the bicyclists themselves.

As a general rule of thumb, it is recommended that minimum standards be applied to all bikeway crossings of collector and arterial streets. This includes signage, striping, adequate lighting, and barriers (for Class I). Special measures are recommended for arterial crossings where the ADT is in excess of 20,000 vehicles per day. Special measures include all of the minimum standards, plus right turn restrictions, signals, and crossing guards.

The most common type of accident is between pedestrian and bicyclist, where the pedestrian and/or bicyclist has made a sudden unpredictable move into the path of the other. There is no remedy for this type of conflict, other than to provide pedestrians options to walk out of the path of bicycles. In order to minimize liability, if a Class I bikeway becomes crowded with non-bicyclists, the route should not be designated a bikeway but a recreation trail.

Bicycle Safety Education Programs

The Bikeways Master Plan provides both physical recommendations (such as bike lanes) and program recommendations. This section covers future efforts to educate bicyclists and motorists, and efforts to increase the use of bicycles as a transportation alternative.

Education

The City's School Districts, Police Department, and the Department of Public Works have a long history of trying to improve safety conditions for bicyclists. Despite these efforts, the lack of education for bicyclists, especially younger students, is a leading cause of incidents. For example, the most common type of reported bicycle incident in California involves a younger person (between 8 and 16 years of age) riding on the wrong side of the road in the evening hours. Studies of incident locations around California consistently show the greatest concentration of incidents is directly adjacent to elementary, middle, and high schools. Many less-experienced adult bicyclists are unsure how to negotiate intersections and make turns on city streets.

Motorist education on the rights of bicyclists and pedestrians is virtually non-existent. Many motorists mistakenly believe, for example, that bicyclists do not have a right to ride in travel lanes in some circumstances and that they should be riding on sidewalks. Many motorists do not understand the concept of 'sharing the road' with bicyclists, or why a bicyclist may need to ride in a travel lane if there is no shoulder or it is full of gravel or potholes.

Existing education programs in schools are generally taught once a year to 3rd, 4th, and 5th graders. Curriculum is generally derived from established programs developed by groups such as the California State Automobile Association, and taught by members of the Police Department. Budget cuts, demands on students' time, and liability concerns limit the extent of bicycle education to school children. Formal adult bicycle education is non-existent.

Action: Establish School Safety Committee Program

A Joint City/School District Safety Committee should be implemented. The Committee would consist of appointed parents, teachers, administrators, police, and engineering services staff whose task would be to identify problems and solutions, ensure implementation, and submit recommendations to the School Board or City Council.

Action: Develop Educational Program Materials and Curriculum

Education materials should be expanded to promote the benefits of bicycling, the need for education and safety improvements, the most recent educational tools available in the country (including the use of low-cost safety videos), and directives to parents on the proper school drop-off procedure for their children. Incentive programs to reward good behavior should be developed. Educational programs, and especially on-bike training, should be expanded to more grades and for more hours per year. Education curriculum should, at a minimum, cover the following lessons:

- on-bike training or bicycle 'rodeos'
- how to adjust and maintain a bicycle
- night riding (clothes, lights)
- rules of the road
- riding on sidewalks
- how to negotiate intersections
- riding defensively
- use of hand signals

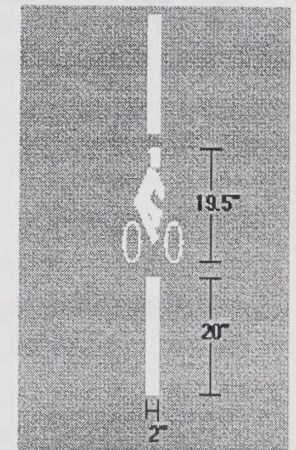
A standard safety handbook format should be developed incorporating the best elements of those currently in use, and made available to each school on disk so they may be customized as needed. Each school should develop a circulation map of the campus and immediate environs to include in the handbooks, clearly showing the preferred circulation and parking patterns and explaining in text the reason behind the recommendations. This circulation map should also be a permanent feature in all school newsletters. Bicycle helmet subsidy-programs are available in California, and should be used to provide low-cost approved helmets for all school children who ride bicycles.

Action: Develop an Adult Education Program

Establish an adult bicycle education program through the City departments that (a) teaches adults how to ride defensively, (b) how to ride on a variety of city streets, and (c) encourages adults to feel more confident to ride to work or for recreation. Work with local bicycling groups who could provide the training expertise, and possibly lead organized bicycle training sessions, tours and rides.

Action: Educate Motorists

Educate motorists about the rights and characteristics of bicyclists through a variety of means including: (a) producing a brochure on bicycle safety and laws for public distribution, and (b) install signs that read 'Share the Road' (recently adopted by Caltrans) at the beginning and then every 1,000 feet on segments of the proposed bikeway system where bicyclists will need to ride in travel lanes (12 feet wide or less) due to the lack of shoulders or bike lanes, where visibility is poor, and where traffic volumes exceed 15,000 ADT. Arterials not part of the bikeways system may also have signs installed after the review and approval of the City Traffic Engineer. In addition, the City is currently looking at providing a 'Bicycle Loop Detector Symbol' in the left-turn lane of protected intersections that demonstrate high levels of bicycle activity.



Sample Loop
Detector Marking

Action: Maintain School Commute Route Improvement Plan

Identifying and improving routes for children to bicycle to school is one of the most cost effective means of reducing AM traffic congestion and addressing existing safety problems. Most effective school commute programs are joint efforts of the school district and city, with parent organizations adding an important element.

Maintain a tool that can be used to evaluate safety conditions on school commute corridors to determine if conditions are within acceptable bounds. This can be done using state or City incident data, surveys of parents on their school commute habits, surveys of students who walk or ride to school, and other sources. Maintain specific thresholds by which meaningful comparisons can be made.

Maintain a toolbox of measures that can be implemented by the school district and City to address safety problems. This may include maps of preferred school commute routes, warning signs, enhanced education, additional crossing

guards, signal treatments (longer cycles, ped activated buttons, etc.), enhanced visibility at key locations (lighting, landscaping abatement), crosswalks, bike lanes, and other measures.

The following process is recommended for developing a Safe Routes to School Program in the City of Orange for student bicycle commuters:

STEPS TO DEVELOP A SAFE ROUTE TO SCHOOL SYSTEM

1. Form a School Commute Task Force composed of representatives from the school district, the City Public Works and police department, the local neighborhood, parent-teachers or other similar groups, and the school itself.
2. Set objectives and a reasonable schedule for this Task Force to accomplish its goals.
3. Determine the preferred basic school commute routes to the school based on (a) parent and student input, (b) a survey of parent and student community patterns, (c) Public Works and police input, and (d) observations of actual commuting patterns.
5. Are there any efforts to guide students who wish to walk or bicycle to school? Does the school provide a map of recommended routes?
6. Does the school wish to encourage more students to walk or bicycle to school? While there is a perception of safety being a concern, statistics show that walking and bicycling are just as safe as driving. Yet many parents insist on driving their children even a few blocks to school--thus contributing to the traffic congestion.
7. Study the parking lot and drop off areas of the school. Is there a pattern where students are walking between cars or through parking lots or drop off areas to reach the school? Are there are management efforts to get parents to follow any specific drop-off protocol?
8. Are there adequate sidewalks and bike lanes on the streets directly serving the school? Are there school access points which encourage students to cross mid-block or at other less desirable locations?
9. Where are the first major street crossings on the main school commute routes? Many accidents occur at these intersections. Are they signalized? Is the signal timing adequate even for younger students? Are right turns on red allowed? Are there crossing guards?
10. Are there any locations where students are crossing major or minor streets at mid-block or unprotected locations, i.e., no stop signs or signals? Because children are sometimes hard to see and have difficulty in gauging vehicle speed, these locations can be the focus of improvements.
11. Do students have to cross intersections that have very wide turning radii, unrestricted right turn movements, where vehicles can accelerate and merge while turning? These are problematic because drivers are focused to

their left at merging traffic rather than in front at crosswalks.

12. Do all intersections have properly designed crosswalks? The crosswalks should be located so that students can wait safely on the sidewalk prior to seeing if they can cross. Is there adequate visibility and lighting given the speed of traffic? Are there adequate warning signs in advance of the crosswalk?
13. What are the 85th percentile speeds of traffic on the major school commute corridors? Are they significantly above or below the posted speed limits? When was the last speed survey conducted? What is the level of police enforcement, and does it occur only at the beginning of the school year? It is possible to lower speed limits near schools. In other locations, it may be necessary to make physical changes, such as narrowing travel lanes, to slow traffic. It may also be preferable to accept slightly more congestion on a two-lane street, and have slower speeds, than have free flowing high-speed traffic on a four-lane street.
14. School Commute Projects involve numerous, often small incremental changes to sidewalks and roadways, such as adjustments to signal timing or new signing or lighting. In other cases, innovative lighted crosswalk treatments or even grade separation may be warranted. Working with the Task Force will help a school determine the best mix of improvements suitable for each corridor, and compatible with local traffic conditions.
15. A more detailed evaluation methodology, which rates improvements and corridors according to objective criteria, has been developed and is available for use by local schools. However, it may require the services of specialists who understand traffic safety and engineering.
16. Once the improvements have been identified, a preliminary design or plan must be completed which describes the project and its cost. For example, a crosswalk improvement would need to be designed so that it can be reviewed and approved by the local agency. Again, a professional may be engaged for this effort.
17. With a plan and cost estimate, the project still needs a sponsor. Typically this would be the City Public Works Department, who are best connected to available funding sources. The project sponsor will need an official authorization, and confirmation that (a) the right-of-way is publicly owned, (b) local staff have reviewed and approved the project, and (c) no negative impacts have been identified. With this in hand, the project sponsor can seek funding, which usually requires a 10% or greater matching amount. This matching amount can sometimes include in-kind services such as administration or design, rather than be cash.

Programs that may be implemented include a "Walking School Bus Program", which involves parents taking turns walking (or bicycling) with groups of children to school.

Community and Employer Outreach

Without community support, a bicycle plan lacks the key resources that are needed to ensure implementation over time. While the City Public Works Department may be responsible for designing and constructing physical improvements, strategies for community involvement will be important to ensure broad-based support--which translates into political support--which can help secure financial resources. Involvement by the private sector in raising awareness of the benefits of bicycling range from small incremental activities by non-profit groups, to efforts by the largest employers in the City. Specific programs are described below.

Bicycle Donation Program

A fleet of lender bicycles available to employees to use as a commute alternative has proved successful in Portland and other U.S. cities. The bicycle may be purchased new or obtained from police auctions, repaired, painted and engraved with ID numbers, and made available free of charge to employees. Depending on demand, bicycles may be made available through reservations or on a rotating basis. The bicycles themselves should be lower-end heavy-duty bicycles that have minimal re-sale value. Employer's responsibilities would be limited to an annual maintenance inspection and repairs as necessary. The objective of the program is to encourage employees to try bicycling to work as an alternative, without making a major investment. Employers may wish to allow bicycle commuters to leave 15 minutes early from work, or some other type of incentive to encourage use of the bicycles. It is recommended that the City of Orange (all Departments) be the first to try this program, and to encourage private employers to follow suit by offering TDM credits or subsidized purchases of bicycles.

Bicycle Clunker and Parts Program, Bicycle Repair Program

This program ties directly into the previous program by obtaining broken, stolen, or other bicycles and restoring them to working condition. The program's dual mission is also to train young people (ages 12-18) how to repair bicycles as part of a summer jobs training effort. Bicycles are an excellent medium to teach young people the fundamentals of mechanics, safety, and operation. Young people can use these skills to maintain their own bicycles, or to build on related interests. The program is often staffed by volunteers from local cycling organizations and bicycle shops, who can help build an interest in bicycling as an alternative to driving. The seed money to begin this program often comes from a local private funding source. The proposal submitted to this source should clearly outline the project objectives, operating details, costs, effectiveness evaluation, and other details. The bicycles themselves could be

derived from unclaimed stolen bicycles from the police department, or from donated bicycles. The program will need to qualify as a Section 501C(3) non-profit organization to offer tax deductions.

Community Adoption

Programs to have local businesses and organizations 'adopt' a pathway such as the Santiago Creek Trail have proven effective around the country, similar to the adoption of segments of the Interstate Highway system. Supporters would be identified by small signs located along the pathway, acknowledging their contribution. Support would be in the form of an annual commitment to pay for the routine maintenance of the pathway, which in general costs about \$8,500 per mile. This program may be administered by the City or other groups.

Bike Fairs and Races

The City is well positioned to capitalize on the growing interest in on-road and off-road bicycle races and criteriums. Events would need to be sponsored by local businesses, and involve some promotion, insurance, and development of adequate circuits for all levels of riders. It is not unusual for these events to draw up to 1,000 riders, which could bring some additional expenditures into the town.

The City can assist in developing these events by acting as a co-sponsor, and expediting and possibly underwriting some of the expense of--for example--police time. The City should also encourage these events to have races and tours that appeal to the less experienced cyclist. For example, in exchange for underwriting part of the costs of a race the City could require the event promoters to hold a bicycle repair and maintenance workshop for kids, short fun races for kids, and/or a tour of the route lead by experienced cyclists who could show less experienced riders how to safely negotiate city streets.

Employer Incentives

Beyond programs described earlier such as the Bicycle Donation Program, additional employer incentives to encourage employees to try bicycling to work could include sponsoring bike fairs and races, providing bicycle lockers and shower facilities, and offering incentives to employees who commute by bicycle by allowing for more flexible arrival and departure times, and possibly paying for transit or taxis during inclement weather. The City may offer incentives to employers to institute these improvements through air quality credits, lowered parking requirements, reduced traffic mitigation fees, or other means.

Bike to Work and Bike to School Days

In addition to the existing annual bike-to-work days, the City could help promote a local bike-to-work day. Bike-to-school days could be jointly sponsored with the School District, possibly in conjunction with bicycle education programs.

Marketing the Bikeways Master Plan

The success of the Bikeways Master Plan depends largely on the community's acceptance and promotion of the Plan's contents. The following are steps that will help ensure it becomes a living document, helping shape the City's future.

- Most of these education and encouragement programs and activities will likely be cooperative efforts between various City departments, private sponsors, and community groups.
- Develop and hold bicycle planning and design training for all transportation engineers and planners.
- Implement Bicycle Friendly Businesses Program.
- Work with towing companies and emergency clean up crews so they better understand the needs of bicycles.
- Work with contractors and subcontractors and City maintenance and utility crews to help them better understand the needs of bicyclists.
- Develop, promote and publicize bicycle commuter services, such as bike shops selling commute gear and regular escorted commute rides.
- Create an annual commuter challenge for area businesses.
- Create events such as "bicycle to the grocery store" days, when cyclists get vouchers for, or coupons off items in the store, or "walk to the movies" days, when cyclists and pedestrians receive free popcorn or a discount on a

movie or refreshments.

- Create public service announcements on radio and TV to promote the health and livability benefits of bicycling, as well as the detrimental effects of excessive motor vehicle use (e.g. pollution, traffic noise, congestion, loss of life and mobility).
- Work with Parks Department to deliver a “benefits of bicycling and walking message” to youth that are working on water, air, and general pollution activities.
- Hold an annual community event to encourage residents to replace one car trip a week with a bicycle trip.
- Promote and publicize new and existing education and encouragement efforts by community groups and businesses.
- Support planning and implementation of an annual mass bicycling ride in the City of Orange to attract new riders, showcase new projects, and demonstrate the benefits of bicycling.
- Develop and implement a public education campaign to encourage bicycling and walking, such as ads on movie screens, city bench, bicycle locker and billboard advertising, and videos on cable access television.

RULES OF THE ROAD:

Always ride on the right. Go with the flow of traffic, never against it.

Be predictable. Maintain a straight line, change direction without swerving, and use hand signals when turning.

Obey all traffic laws. If you want to be safe in traffic you have to act like traffic.

Pay attention. Use your eyes and ears as warning devices, alerting you to potential hazards in time to take action.

Assert yourself. Don't let vehicles creep by and force you into parked cars or the curb. You have a legal right to the lane, so take as much as you need for safety.

Ride defensively. Expect a car to pull out from the side street or turn left in front of you. If you anticipate the worst it will rarely happen.

Be visible. Wear bright colors and put reflectors and reflective tape on your bicycle.

Shout. It's the quickest, most effective way to let a motorist know that he or she is putting you in danger, or to alert an inattentive pedestrian that you are approaching.

Rules of the Road were formulated by the editors of Bicycle Magazine, 1990

Monitoring and Maintenance

Once the Bikeways Master Plan has been adopted, a monitoring effort is required to ensure that the recommendations are enforced and the system is maintained over time. The following actions are suggested:

- Action: Plan Review. All development and infrastructure improvement plans should be reviewed by the Engineering Department to ensure that bikeway segments are implemented, developer requirements are being met, and design standards adhered to in accordance with this document.
- Action: Commercial Driveway Sight Distance. Driveway Sight Distance to provide appropriate visibility to see bicycles riding on sidewalks should be reviewed as part of the plan review process.
- Action: Incident monitoring. Bicycle-related incident data should be collected annually and evaluated to determine areas of concern.

Maintenance

The total annual maintenance cost of the proposed bikeway system is estimated to be [need miles of class I X \$8,500) when it is fully implemented. About two-thirds of the maintenance costs are associated with the proposed off-road bike paths. Class

I bike path maintenance costs are based on \$8,500 per mile, which covers labor, supplies, and amortized equipment costs for weekly trash removal, monthly sweeping, and bi-annual resurfacing and repair patrols includes cleaning, resurfacing and re-striping the asphalt path, repairs to crossings, cleaning drainage systems, trash removal, landscaping, underbrush and weed abatement (performed once in the late spring and again in mid-summer).

Maintenance access on the Class I bike path will be achieved using standard pick-up trucks on the pathway itself. Sections with narrow widths or other clearance restrictions should be clearly marked. Class I bike path maintenance.

Action: Maintenance. The Public Works Department should track long term bike path maintenance, schedule repairs on all City bike facilities, and respond to calls from the public or staff regarding maintenance needs.

Action: Identify a reliable source of funding to cover all new Class I bike path construction. All proposed designs should be closely examined to minimize future maintenance costs.

Security

Security may be an issue along portions of the proposed Class I bike paths. The following actions are recommended to address these concerns.

Action: Enforcement of applicable laws on bike paths will be performed by the Police Department, using both bicycles and vehicles. Enforcement of vehicle statues relating to bicycle operation will be enforced on Class II and Class III bikeways as part of the department's normal operations. No additional manpower or equipment is anticipated for Class II or III segments.

Action: Normal bike path hours of operation should be 6AM to 9PM, unless otherwise specified

COST ANALYSIS

SYSTEM BENEFITS VS. COST

The need for a bikeway system is based on the following factors:

1. Reducing traffic congestion.
2. Improving air quality.
3. Elimination of safety hazards.
4. Providing connections to improve circulation.
5. Increasing recreational opportunities.

Demand for bikeway facilities is demonstrated by survey results that show that over one half of all residents own bicycles, with over half of these owners riding their bikes at least once a week. This constitutes a sizable percent of the Orange population, and as such constitutes a justification for the system. Providing safe, well-maintained bicycle facilities for its residents is a City function as a part of the Circulation Element of the General Plan.

Commercial and industrial facilities must also share the responsibility of promoting bicycling as a viable alternative to auto commuting. There are several statewide programs that require new commercial and industrial development to implement Congestion Management Programs that will help reduce traffic congestion.

The South Coast Air Quality Management District's Trip Reduction Plan (also known as the commuter Program) seeks to reduce traffic congestion by requiring companies with 100 or more employees to promote alternative means of transportation. The Trip Reduction Plan provides training and assistance to businesses in coordinating a commuter program that will efficiently serve all employers, while reducing the number of vehicles on the road.

Businesses can benefit by encouraging their employees to use any of the alternative forms of transportation identified in the commuter Program. These alternative modes of transportation include: walking or bicycling to work, carpool/buspool, mass transit and automobiles operating on alternative clean-burning fuels. The Commuter Program should help promote bicycling as a more accessible form of commuting, by requiring employers to provide bikeway facilities such as bike racks, showers, and lockers at employment centers.

Another countywide program that promotes congestion management strategies such as alternative work schedules and non-motorized transportation is the Tier 1 Air Quality Management Program Transportation Control Measures. This program

addresses a variety of congestion management tactics such as employer rideshare and transit incentives, traffic flow improvements, and person-work trip reductions, each of which can help reduce traffic congestion. Bicycling to work is also addressed in the program guidelines by requiring local governments to include bicycle routes in their General Plans for congestion management. The Tier 1 program also states that local governments must enact ordinances requiring major new commercial and industrial facilities to provide bicycle parking and shower facilities.

FUNDING SOURCES

There are a variety of potential funding sources including local, state, regional, and federal funding programs that can be used to construct the proposed bicycle improvements. Many of the federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for bicycle projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each community based on gasoline taxes. The key to receiving funds will be to tailor grant requests to meet specific requirements and criteria, leverage grants with matching funds, and demonstrate a serious intent by the City to implement and maintain the system. Serious intent by the city would include adoption of the Master Plan, inclusion of bikeway improvements into the Capital Improvements Plan, adoption of recognized design and operating standards, and public support demonstrated through an active Advisory Group. The following list gives a brief description of available federal, state, regional, and local funding sources for bicycle projects in the City of Orange. The chart beginning on page 46 identifies potential funding sources and application criteria for grants appropriate for bikeway implementation.

Federal

TEA-21

Federal funding through the TEA-21 (Transportation Equity Act for the 21st Century) program will provide the bulk of outside funding. TEA-21 currently contains three major programs, STP (Surface Transportation Program), TEA (Transportation Enhancement Activities), and CMAQ (Congestion Mitigation and Air Quality Improvement) along with other programs such as the National Recreational Trails Fund, Section 402(Safety) funds, Scenic Byways funds, and Federal Lands Highway funds. With the recent authorization of TEA-21, bicycle projects stand to gain from an estimated 40% increase in funding available for such projects.

TEA-21 funding is administered through the state (Caltrans or Resources Agency) and regional governments (Orange County

Transportation Authority). Most, but not all, of the funding programs are transportation versus recreational oriented, with an emphasis on (a) reducing auto trips and (b) providing an inter-modal connection. Funding criteria often includes completion and adoption of a bicycle master plan, quantification of the costs and benefits of the system (such as saved vehicle trips and reduced air pollution), proof of public involvement and support, CEQA compliance, and commitment of some local resources. In most cases, ISTEA provides matching grants of 80 to 90 percent--but prefers to leverage other moneys at a lower rate.

With an active and effective regional agency such as the OCTA, the City of Orange should be in a good position to secure more than its fair share of TEA-21 funding. It will be critical to get the local state assemblyman and senator briefed on these projects and lobbying Caltrans and the California Transportation Commission for these projects.

State

TDA Article III (SB 821)

Transportation Development Act (TDA) Article III funds are state block grants awarded annually to local jurisdictions for bicycle and pedestrian projects in California. These funds originate from the state gasoline tax and are distributed to local jurisdictions based on population. The City of Orange may use its TDA funds for bicycle projects, and compete for additional TDA funding from the OCTA.

AB 434

AB 434 funds are available for clean air transportation projects, including bicycle projects, in California. These funds are distributed on the regional level through the Air Pollution Control District.

Bicycle Transportation Account

The State Bicycle Transportation Account (BTA) is an annual statewide discretionary program that is available through the Caltrans Bicycle Facilities Unit for funding bicycle projects. Available as grants to local jurisdictions, the emphasis is on projects that benefit bicycling for commuting purposes. While the fund is currently small (1 million dollars available annually), it will be increased to 7.2 million dollars per year starting in FY 2001 with a possible increase to twelve (12) million dollars per year by the state assembly and senate. The City of Orange may apply for these funds through the Caltrans Office

of Bicycle Facilities.

Safe Routes to School (AB 1475)

The Safe Routes to School program is a newly created state program using funds from the Hazard Elimination Safety program from TEA-21. This new program for 2000 is meant to improve school commute routes by eliminating barriers to bicycle and pedestrian travel through rehabilitation, new projects, and traffic calming. A local match of 11.5% is required for this competitive program, which will allocate \$18 million annually. Planning grants are not available through this program.

Regional

Clean Air Funds

Clean Air Funds are generated by a sur charge on automobile registration. The Orange County Transportation Authority Board may allocate some of these funds for external projects. The grants are generally in the \$50,000 to \$200,000 range and are highly competitive based on a cost-benefit formula developed by the District. Awards are made to those projects that most closely meet the intent of the legislation and the requirements in the RFP. Projects must be shown to have a direct and positive effect on the air quality from the transportation sector within Orange County.

Local

New Construction

Future road widening and construction projects are one means of providing bike lanes. To ensure that roadway construction projects provide bike lanes where needed, it is important that an effective review process is in place to ensure that new roads meet the standards and guidelines presented in this master plan.

Impact Fees

Another potential local source of funding is developer impact fees, which are typically tied to trip generation rates and traffic impacts produced by a proposed project. A developer may reduce the number of trips (and hence impacts and cost) by paying for on- and off-site bikeway improvements which will encourage residents to bicycle rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

Mello Roos

Bike paths, lanes, and pedestrian facilities can be funded as part of a local assessment or benefit district. Defining the boundaries of the benefit district may be difficult unless the facility is part of a larger parks and recreation or public infrastructure program with broad community benefits and support.

Other

Local sales taxes, fees, and permits may be implemented, requiring a local election. Volunteer programs may substantially reduce the cost of implementing some of the proposed pathways. Use of groups such as the California Conservation Corp (who offer low cost assistance) will be effective at reducing project costs. Local schools or community groups may use the bikeway or pedestrian project as a project for the year, possibly working with a local designer or engineer. Work parties may be formed to help clear the right of way where needed. A local construction company may donate or discount services. A challenge grant program with local businesses may be a good source of local funding, where corporations 'adopt' a bikeway and help construct and maintain the facility.

Other opportunities for implementation will appear over time that may be used to implement the system.

The key to receiving funds will be to tailor grant requests to meet specific requirements and criteria, leverage grants with matching funds, and demonstrate a serious intent by the City to implement and maintain the system. Serious intent by the city would include adoption of the Master Plan, inclusion of bikeway improvements into the Capital Improvements Plan, adoption of recognized design and operating standards, and public support demonstrated through an active Advisory Group. The chart beginning on page 46 identifies potential funding sources and application criteria for grants appropriate for bikeway implementation.

IMPLEMENTATION COSTS

The following pages list all street segments proposed for new bike lanes in the City and are divided into two phases, an initial group of projects that can be accomplished within five years, and the balance that can be developed over an extended time period. Each year the City will, as part of the Capital Improvements Program, review the phases for appropriate priority changes based on information current at the time. City funds will be budgeted based on availability, with grants and discretionary regional funding sought where significant implementation costs are involved (i.e. right-of-way acquisition, off road trail construction). The city will work cooperatively with other agencies (CalTrans, County of Orange, Orange County Transportation Authority) and adjacent cities to implement the Bikeways Master Plan.

Estimated funding for the two phases is provided in the following chart. Although the cost estimates are based on actual costs experienced in various California communities, more detailed cost estimates should be developed after preliminary engineering.

CLASS I	
Rehabilitate or upgrade existing path	\$ 90,000/mile
Construct asphalt path on existing level embankment or right of way, includes signing and striping	\$ 175,000/mile
Construct asphalt path on graded right of way, requires drainage and new subbase	\$ 275,000/mile
Construct asphalt path within ungraded corridor, some retaining walls required	\$ 500,000/mile
CLASS II	
Signing and striping	\$ 5,000/mile
Signing and striping, <u>minor</u> surface repair	\$ 15,000/mile
Signing and striping, surface repair	\$ 25,000/mile
Signing and striping, road widening	\$ 50,000/mile
CLASS III	
Signing	\$ 1,500/mile
SUPPORT FACILITIES	
Loop Detectors	\$ 2,500/ intersection
At grade-crossing	
Signing / Striping	\$ 5,000/each
Signal	\$ 60,000/each

Phasing Plan

Short-term projects identified in this plan represent the highest priority bicycle projects currently identified in the City of Orange. Local available matching funds, such as TDA, should be allocated whenever possible to these projects or to other locally identified projects that meet the funding criteria of the TDA program. The actual schedule for implementation on a year-to-year basis should be determined by (a) the readiness of each project in terms of local support, (b) CEQA approvals, (c) right-of-way control, (d) timing with other related improvements, and/or (e) success in obtaining competitive funding.

The Bicycle Advisory Committee and staff should monitor the short- and mid-term projects identified in this Plan and subsequent updates, and keep a year-to-year list of projects and their TDA and other local funding allocations. Should a project not be ready or able to utilize its allocation, it may trade with another short-term project. This process eliminates the constant evaluation of new projects and ensures that viable top priority projects have access to matching funding. It provides the City with a five to 10 year schedule so that it may program resources and feel assured that projects will be implemented in the short term. Each year the BAC and staff will review the list of projects slated for that year, review the project readiness of each project to be funded, and listen to requests for changes to the sequencing of the projects.

PHASE I					
Street	Segment	Class	Length	Cost	Comments
Almond	Feldner to Cambridge	III	8000' 1.52 miles	\$ 2,280	
Bedford	Palmyra to La Veta	III	1250' .24 mile	\$ 500	
Feldner	Almond to Palmyra	III	500' .1 mile	\$ 250	

PHASE I (continued) Street	Segment	Class	Length	Cost	Comments
Glassell	Fletcher to Meats	II	2000' .38 mile	\$ 5,700	
Katella	Handy to Wanda	II	2000' .38 mile	\$ 5,700	
La Veta	Bristol Overpass to Bedford	II	2250' .47 mile	\$ 7,050	
Meats	Glassell to Cambridge	II	2750' .52 mile	\$ 7,800	
	Cambridge to Santiago Boulevard	II	5280' 1 mile	\$ 15,000	
	Villa Park City Limits to Anaheim City Limits	II	5500' 1.04 miles	\$ 15,600	Remove painted "median" (Villa Park City Limits to Summitridge)
Palmyra	Feldner to Bedford	III	250' .05 mile	\$ 250	
Santiago Creek	Santa Ana City Limits to Cambridge	I	5000' .96 mile	\$ 400,000	
	Cambridge to SR 55 (at Palmyra)	I	5170' .99 mile	\$ 200,000	

Taft	Batavia to Glassell	II	2100' .39 miles	\$ 19,500	
Tustin	Taft to Taft	I	750' .14 mile	\$ 24,500	East side - Class I path to be located on Edison property (North bound traffic)
		II	.14 mile	\$ 2,100	West side - Class II (South bound traffic)
TOTAL PHASE I			8.18 miles	\$ 706,230	
PHASE II					
Batavia	Palm to La Veta	II	3750' .71 mile	\$ 3,550	Class II and Class III
Bond	Prospect to Hewes	II	3000' .57 mile	\$ 8,550	
Cambridge	La Veta to Creek	II Timed	750' .14 mile	\$ 2,100	
	Creek to Fairhaven	II	1750' .33 mile	\$ 4,950	
Cannon	Santiago Canyon Road to Chapman	II	9500' 1.80 miles	\$ 27,000	
Canyon View	Newport to Jamboree	II	4000' .76 mile	\$ 11,400	
	Chapman to Outrider	II	4500' .85 mile	\$ 12,750	

PHASE II (continued) Street	Segment	Class	Length	Cost	Comments
Chapman	Hewes to Cannon	II	3000' .57 mile	\$ 8,550	
Collins	Handy to Wanda	II	1250' .24 mile	\$ 3,600	
Esplanade	La Veta to Fairhaven	II	3000' .57 mile	\$ 8,550	
Fairhaven	Santa Ana City Limits to Hewes	II	10500' 1.99 miles	\$ 29,850	
Fletcher	Batavia to Glassell	II	2500' .47 mile	\$ 7,050	
Garden Grove Blvd.	Lewis to Santa Ana River	II	2500' .47 mile	\$ 7,050	
Glassell (North)	River to Lincoln	II	2500' .47 mile	\$ 7,050	
	Meats to Katella	II	4950' .94 mile	\$ 14,100	
	Katella to Palm	III	6250' 1.24 miles	\$ 1,860	

PHASE II (continued) Street	Segment	Class	Length	Cost	Comments
Glassell (South)	Almond to La Veta	III	2000' .38 mile	\$ 500	
	La Veta to Santa Ana City Limits	II	2000' .38 mile	\$ 1,520	
Grand	Palm to Almond	III	2000' .38 mile	\$ 5,700	
Hewes	Rancho Santiago to Fairhaven	II	14000' 2.65 miles	\$ 79,500	Expand paving (Rancho Santiago to Bond)
La Veta (West)	Batavia to Parker	II	750' .14 mile	\$ 2,100	
La Veta (East)	Santiago Creek to Esplanade	II	8000' 1.52 miles	\$ 22,800	
Lemon	Palm to Almond	III	2000' .38 mile	\$ 500	
Lewis	Lampson to Garden Grove Blvd.	II	3000' .57 mile	\$ 8,550	
Lincoln Avenue	Batavia to 55 Freeway	II	8250' 1.56 mile	\$ 23,400	
Lincoln Street	Walnut to Palm	III	1500' .28 mile	\$ 500	

PHASE II (continued) Street	Segment	Class	Length	Cost	Comments
Main	Taft to Palm	II	9250' 1.76 mile	\$ 26,400	
Maple	Rail to Lemon	III	300' .06 mile	\$ 2,500	Coordination with OCTA will be required
Newport	Chapman to Tustin City Limits	II	5000' .95 mile	\$ 14,250	
Nohl Ranch	55 Freeway to Anaheim City Limits	II	2750' .52 mile	\$ 7,800	
Palm	Main to Lincoln	III	8750' 1.66 mile	\$ 2,500	
Palmyra	Creek to Rail	III	2500' .47 mile	\$ 500	
Parker	La Veta to Santiago Creek	II	2750' .52 mile	\$ 7,800	
Prospect	Spring to Fairhaven	II	6750' 1.28 miles	\$ 19,200	Acquire additional right of way & expand paving (Larkstone to Fairhaven). Costs do not include land or right of way.
Rail	Collins to Creek	I	3000' .57 mile	\$ 99,750	
	Creek to Fairhaven	I	9500' 1.80 miles	\$405,000	

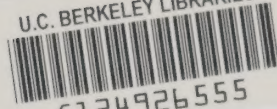
Rancho Santiago Blvd.	Santiago Canyon Road to Hewes	II	1500' .28 mile	\$ 4,200	
Santiago Creek	SR 55 at Palmyra to Santiago Oaks Regional Park	I	22500' 4.26 miles	\$1,177,000	
Serrano	Cannon to Nohl Ranch Road	II	12000' 2.27 miles	\$ 34,050	
Spring	Prospect to Hewes	II	3750' .71 mile	\$ 10,650	
Tustin	Santa Ana River to Lincoln	II	5000' .95 mile	\$ 14,250	
Tustin Branch Trail	Santa Ana River to Santiago Blvd.	I	16000' 3.03 miles	\$3,000,000	A short segment extents into the Villa Park City Limits to reach Santiago Blvd. Midblock signals needed: Main, Batavia, Glassell, Cambridge & Tustin
Via Escola	Meats to Cannon	II	5750' 1.09 miles	\$ 16,350	
Walnut	River to Shaffer	II	10000' 1.89 miles	\$ 28,350	
	Handy to Prospect	II	3500' .66 mile	\$ 9,900	
TOTAL PHASE II			44.62 miles	\$ 5,183,480	
TOTAL PHASE I & II			52.80 miles	\$ 5,889,710	

FUNDING SOURCES

Grant Source	Due Date	Agency	Annual Total	Match Req'd.	Eligible Applicants	Eligible Bike Projects			Comments
						Com-muter	Recre-ation	Safety/Educ.	
State Highway Account (SHA)	Dec 1 odd years	Caltrans	\$360,000 state wide		Apply through Caltrans	X	X		Project must be on a state highway & prove that it will contribute to increasing safety
California Coastal Conservancy	all year	Coastal Conservancy	varies	varies			X		
Habitat Conservation Fund Grant Program	October	State Parks & Rec Dept.		50%	Cities, Counties, special districts	X	X		Fund will last until 2020. Must comply with CEQA, NEPA and demonstrate land ownership. Contact Dept of Parks & Recreation (916) 653-7423
Land & Water Conservation Act of 1965	Dec	State Parks & Rec Dept		50%			X		Funding subject to North/South split. Contact CA Dept Parks & Rec 916-653-7423
Transportation Development Act (TDA) Section 99234	April 1			None	Cities, County, Currently allocated by population	X	X	X	
Vehicle Registration Fee AB 434	May			None	Cities, County, Transit Operators	X	X	X	For projects that demonstrate reductions in emissions

Developer fees	Ongoing	Cities, County		None		X	X	X	Mitigation during land use approval
State Gas Tax	Monthly allocatio n	Allocated by State Auditor		None		X	X	X	

U.C. BERKELEY LIBRARIES



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